















THE FESTIVUS

Vol. 1, No. 1, Dec., 1969

San Diego Museum of Natural History  
Third Thursday of each month 7:30 p. m.

President: Carole Hertz      Vice President: Nola Michel  
Recording Secretary: Barbara Myers  
Corresponding Secretary: Barbara Good  
Treasurer: Peggy Mulliner      Editor: Blanche Brewer

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GREETINGS-

to all members of the San Diego Shell Club.

Our avowed intention is to make this a monthly publication - to mail it to your homes before the regular meeting so you will know the projected program and to remind you of the meeting date. (Telephone notice will not be given unless personally requested).

With an editorial staff having specific duties, publication will be organized and simplified. Our staff is composed of: Reporters: Clifton Martin, Clifford Martin, Normin Currin and John Souder - Coordinating chairman: Nola Michel - Publishing: Dave Mulliner - Distribution: Virginia Hanselman - Editor: Blanche Brewer.

We can earnestly invite your participation as contributors. With it we can have an informative and enjoyable magazine and - let's face it - without it, no magazine at all.

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THUMBNAIL SKETCHES  
OF  
OUR OFFICERS FOR 1970

PRESIDENT: CAROLE HERTZ

Carole has an intense interest in the sea, she finds diving one of the most pleasant ways to shell collect. Carole's shell collection began four years ago with a dead astrea she had found on Point Loma and curiously began to look up sea shells in library books.

In 1965 Carole and Jules Hertz joined the San Diego Shell Club. She was secretary in 1968 and treasurer in 1969.

Carole's major interests are shells, art, and music. The Hertz Collection of sea shells are world wide. They collect Local, Gulf, and Florida shells and trade world-wide. Carole helps out at the Museum of Natural History cataloging shells.

VICE PRESIDENT: NOLA MICHEL

Nola was taking scuba diving lessons in Kwajalein in 1961. Her diving instructor turned over a rock and the beautiful world of sea shells opened up before her eyes. Nola has continued her







scuba diving and with her husband John has collected shells in Hawaii, Kwajalein, local, and Gulf. When John is in foreign ports he buys shells he cannot collect himself.

Nola's major interests are shells, music, diving and oceanography.

Nola joined the Shell Club in 1965. She was Treasurer in 1968 and President in 1969.

#### RECORDING SECRETARY: BARBARA MYERS

Barbara and John Myers joined the San Diego Shell Club in 1966 to share and learn more about their interest in shells. In 1967 Barbara held the office of Secretary.

Barbara's interest in shells began with the beauty and varied sculpture attracting her gradually increasing scientific awareness.

The Myers collect local shells and have just started to trade world-wide. They share an interest in marine aquaria, photography and shells.

#### CORRESPONDING SECRETARY: BARBARA GOOD

Barbara was walking a Los Angeles beach with a neighbor in 1959 and as something to do began to kick up shells from the drift. Her interest in shell collecting and learning about the sea molluscs has increased through the years.

Barbara's major interest is shells. She is fascinated by and spends many hours studying the minute shells from the grunge.

The Good Collection is mostly Florida, Local, Gulf, and some world-wide obtained by trading. Her favorite families are Murex, Cykraea, and Volutes. Barbara helps out with the cataloging of shells in the Museum of Natural History.

#### TREASURER: MARGARET MULLINER

Peggy joined the Shell Club in 1965 to share her husbands new hobby. The auction that year was at Norm Currin's. Peg's interest began as she looked at and handled the beautiful shells from far distant shores. She bought a few shells and was invited by several people to come see their collections.

Pegs collection is mostly Local and Gulf with some world-wide shells obtained by trading.

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#### ACTIVITIES REPORT

We are making a new start but we do not want to overlook - for the record - items of interest in the fall meetings.

In September we were the guests of Jules and Carole Hertz. In





their completely private backyard, the scene was set for a Hawaiian luau. Arriving members and guests wore appropriate attire. Delicious food and the flowing bowl refreshed us and the talented sisters, Billie Dihworth and Twila Brachter, entertained us with graceful island dances.

John Myers and David Mulliner showed slides of living lovelies in their aquariums.

Fun was had by all!!

Dr. Don Shasky was the speaker at our October meeting - his subject, Cancellaridae. This family is not well known or profitably exhibited in collections. No satisfactory classification exists and many of the earliest described species are known only by the types. Genus Cancellaria was described by Lamarck in 1799. Known subgenus include Cancellaria (Cancellaria) - C. (Aphera) - C. (Bivetia) - C. (Bivetiella) - C. (Bivetopsia) - C. (Euclia) - C. (Hertleinia) - C. (Massyla) - C. (Narona) - genus Agatrix - genus Perplicania - genus Trigonostoma and genus Admete.

Dr. Shasky showed slides of all specimens mentioned and had the shells themselves for close examination. The full text is available in our library - some 12 pages.

A young associate in the museum George Kennedy, presented the family Pholadidae in November. They are not particularly beautiful or even pretty but they have satisfied the hungry appetites of countless generations of clam diggers. Mr. Kennedy's interest is largely in the comparisons with fossil forms.

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## NOTES ON THE EVOLUTION OF THE MURICIDAE

By Dr. George Radwin

In the past several months, since the arrival of Tony D'Attilio to the San Diego Natural History Museum, we have been attempting to arrive at a better understanding of the relationships between many genera in the Muricidae. We have relied heavily on the radular dentition without neglecting the clues offered by the shell morphology. Our progress, to date, is the basis of these notes.

As we are not paleontologists, we have relied mainly on the data we could obtain from literature for apparent geological ranges of the genera with which we have worked. The importance of this feature is that with this information we could, perhaps, understand how two or three more apparently closely related genera have evolved, chronologically, one from another.

The genera considered were: Hexaplex (type species - Murex chicleus), Phyllonotus (type species - Murex margaritensis), Chicoreus (type species - Murex ramosus L.), Muricanthus (type





species - Murex radix), Siratus (type species - Murex senegalensis), Homalocantha (type species - Murex scorpio).

All of these groups but one (Hexaplex) are now represented in the New World and all but two of these (Chicoreus and Siratus) are represented at present in the eastern Pacific.

Hexaplex is known from as early as the Eocene. As an early member of the line of genera under consideration, this genus is supposed to have given rise, directly or indirectly, to all of the others.

The shell of Hexaplex, as seen in its type species, is very much like the shells of several of the other genera. The only key character is the presence of six varices on the body whorl, a variable character at best.

Phyllonotus is known from as early as the Oligocene. Its shell resembles the shell of Hexaplex from which it almost certainly was derived directly. Key shell characters are its orange or pink rimmed aperture, its globose body whorl and its short, blunt spines.

Chicoreus is known from the lower Miocene. Its shell resembles that of Hexaplex, except that Chicoreus has three varices, whereas Hexaplex has six. Chicoreus is also a likely direct derivative of Hexaplex.

Muricanthus, known from the upper Pliocene, is the most recent derivative of this group. Its shell, once again, is very similar to those of Hexaplex and Chicoreus. It was probably derived from Hexaplex, directly or indirectly, via Chicoreus.

Siratus is known first from the lower Miocene. In its general appearance it most closely resembles Phyllonotus.

Homalocantha has an unknown geological history, as no fossil representatives have been discovered. Previously thought to be limited to the Indo-Pacific, this genus is now known to have representatives in the eastern Pacific. Several species (Murex oxyacantha and Murex multicristatus) may be shown to belong to Homalocantha on the basis of several shell and radular characters.

Having arrived at tentative conclusions concerning the relationships among these genera, we attempted to confirm these conclusions using the radular dentition.

The results of the examination of the radulae are as follows:

The lateral radular teeth throughout this family are of little systematic significance. The median tooth has five cusps; a very large central, two prominent laterals and two smaller cusps called intermediates because of their position; each between the central and a lateral.

The striking feature of the median tooth of Hexaplex is a





prominent longitudinal ridge on the central cusp. Other genera with similar median radular teeth and also with this prominent ridge are Chicoreus and Muricanthus. This, to us, confirms their linear evolutionary relationship.

The median radular tooth of Phyllonotus has a broad base with broad lateral cusps which have concave outer margins. No ridge is present on the central cusp. On this basis, as well as on shell morphology, we feel that Phyllonotus may well have been directly derived from Hexaplex but could not, in our opinion, be part of the Hexaplex-Chicoreus-Muricanthus line.

Siratus has a radula and shell which slightly resemble those of Phyllonotus. Present indications are that Siratus was derived from Phyllonotus.

Little that is conclusive may be gained concerning Homalocantha because of the lack of a fossil record. It is guessed, however, that it is a family of considerable age as it is essentially circumtropical in distribution (eastern Pacific - M. (H.) oxyacantha; western Australia - M. (H.) secundus; Indo-Pacific - M. (H.) anatomicus etc.; western Africa - M. (H.) melanamathos). Its radula is very peculiar and weak-appearing. The intermediate cusps are almost obliterated, and are, instead, nearly completely confluent with the lateral cusps.

To sum up: The geological history and the morphology of the shell and radula of modern forms indicate the presence of two distinct lines diverging from the genus Hexaplex. In one line, the genera Chicoreus, Homalocantha and Muricanthus evolved in approximately that chronological order. In the other line, the genera Phyllonotus and Siratus evolved in that general order.

(Dr. Radwin's paper was not received in time for the October issue of the Shell News. Ed.)

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#### COLLECTOR'S ITEM

On a fine summer day - August 20 - a handful of shell collectors had a momentous meeting.

Dr. T. Shikama of the Geological Institute of Yokohama National University arrived in San Diego (by bus) from Los Angeles. He was met by Ben and Ruth Purdy and then taken to their home for lunch. He had expressed a desire to see their fine collection and of course he did - but Ben and Ruth said "Now what would you really like to do?" "I have three wishes" he said, "I wish to put my feet in this side of the Pacific - I wish to meet Anthony D'Attilio and I wish to go to Mexico."

The first two were possible. With Kay Webb, a long-time correspondent of Dr. Shikama, they took him to the Silver Strand. There he removed his shoes to happily wade in the warm water of the (to him) Eastern Pacific.





The consul advised them that while they might get him into Mexico, they might not get him out. So they went down to the border, stopping on this side, and walked to the very line where he took many pictures.

When Tony D'Attilio was able to leave the museum, he and Rose were able to visit with the tiny enthusiastic visitor from Japan at the Purdys. Dr. Shikama had only a few hours but he stretched them to the last possible moment before they took him to his plane which would carry him further on his trip around the world. He has been heard from - New York and Switzerland. One wishes him happy landings.

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### 1969 CHRISTMAS PARTY

The Shell Club held its annual Christmas party at the Miramar Naval Air Station CPO Club on Friday evening, Dec. 12th. The U-shaped banquet tables were festively decorated by Helen Thompson, with each place setting having its own centerpiece of clustered shells. Upon arriving, each guest placed a gaily wrapped shell gift under the Christmas tree. An open bar was available for those who wished a bit of special Christmas cheer.

After a delicious steak or lobster dinner, annual officer installation ceremonies were held with Dave Mulliner officiating as congenial Master of Ceremonies. Each lady officer was presented a beautiful orchid corsage and the lone gentleman a carnation boutonniere. Nola Michel relinquished her duties as president to Carol Hertz. As vice president, Nola replaced Dr. George Radwin. Outgoing secretary Barbara Myers was retained as recording secretary, with Barbara Good as corresponding secretary. Peggy Mulliner replaced Carol Hertz as treasurer.

An honorary membership was presented to Frank Good in appreciation for the great help he gave the Club during its incorporation.

John Souder was appointed Mentor Parliamentarian and as such may attend all board meetings. It was further announced that John, who had been critically ill for several weeks following a severe heart attack, was considerably improved, news which all members were most happy and grateful to receive.

Tony DeAttilio was given a large box of stationery for his very artistic designing of the Club's letterhead --- a beautifully and intricately designed drawing of a Murex festivus.

Blanche Brewer, for her untiring work as our editor, was awarded an orchid corsage.

After the ceremonies each guest selected a gift package and many members found there had choice new specimens to add to their collections. A social evening followed, with dancing to the CPO Club's orchestra. It was for all a great evening and a





fitting climax for a wonderful year with our club. May 1970  
be as rewarding in its programs and accomplishments.

— Normin Currin

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#### BOOK NEWS

During the past month the San Diego Shell Club library was able to acquire a series of new books, several of which have just been published. In future issues these and other new books will be reviewed. The reviews will usually be those of the amateur shell collectors and will stress the value of the literature to the collector rather than the highly professional, technical man.

Below is a list of the newly acquired books:

1. "A Collector's Guide to West Coast Chitons", by Glenn E. Burghardt and Laura E. Burghardt, Special Publication No. 4, San Francisco Aquarium Society, Inc., Nov. 1969.
2. "Marine Shells of Southern California", by James H. McLean, Science Series 24, Zoology No. 11, Los Angeles County Museum of Natural History, October, 1969.
3. "The Log from the Sea of Cortez", by John Steinbeck, Viking Press, Sixth Printing, August, 1968.
4. "Mollusks", by Paul Bartsch, Dover Publications, Inc., 1968.
5. "Molluses", by J. E. Morton, Hutchinson University Library, London, 1958.
6. "Caribbean Sea Shells", by Germaine L. Warmke and R. Tucker Abbott, Livingston Publishing Company, Narberth, Pennsylvania, 1961.
7. "Stalking the Blue-Eyed Scallop", by Euell Gibbons, David McKay Company, Inc., New York, 1964.
8. "Systematics and Zoology of the Worldwide Bathypelagic Squid Bathyteuthis (Cephalopoda: Oegopsida)", by Clyde F. E. Roper, Smithsonian Institution Bulletin 291, Washington, D. C., 1969.
9. "An Illustrated Key to the Families of the Order Teuthoidea (Cephalopoda)", by C. F. E. Roper, R. E. Young, and G. L. Voss, Smithsonian Contributions to Zoology, Number 13, 1969.
10. "A Monograph of the Cephalopoda of the North Atlantic: The Family Joubiniteuthidae", by R. E. Young and C. F. E. Roper, Smithsonian Contributions to Zoology,





Number 15, 1969.

11. "A Monograph of the Cephalopoda of the North Atlantic: The Family Cycloteuthidae", by R. E. Young and C. F. E. Roper, Smithsonian Contributions to Zoology, Number 5, 1969.
12. "The Immense Journey", by Loren Eiseley, Vintage Book, Random House.

-by - Jules Hertz

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GOOD TIDES!!!!!!

LOCAL (San Diego) PST (24 hr. clock)

Jan.	18	Sun	13:54	-0.7
	19	Mon	14:30	-0.9
	20	Tue	15:00	-1.0
	21	Wed	15:24	-1.0
	22	Thurs	15:54	-0.9
	23	Fri	16:18	-0.7
Feb.	2	Mon	13:12	-0.9
	3	Tue	13:54	-1.6
	4	Wed	14:30	-2.0
	5	Thr	15:12	-2.1
	6	Fri	15:48	-1.9
	7	Sat	16:24	-1.5
	8	Sun	17:00	-0.8

Guaymas (Sonora, Mexico) MST

Jan.	15	Thurs	13:48	-0.6
	16	Fri	14:12	-0.9
	17	Sat	14:36	-1.2
	18	Sun	15:00	-1.3
	19	Mon	15:18	-1.4
	20	Tue	15:42	-1.4
	21	Wed	16:06	-1.4
	22	Thurs	16:24	-1.3
	23	Fri	16:48	-1.2
	24	Sat	17:06	-0.9
	25	Sun	17:24	-0.6
	31	Sat	12:54	-0.8
Feb.	1	Sun	13:30	-1.3
	2	Mon	14:12	-1.7
	3	Tues	14:54	-2.0
	4	Wed	15:30	-2.1
	5	Thurs	16:06	-1.9
	6	Fri	16:42	-1.6
	7	Sat	17:06	-1.0
	13	Fri	13:18	-0.6





(Guaymas continued)

Feb. 14	Sat	13:54	-0.8
15	Sun	14:24	-1.0
16	Mon	14:48	-1.1
17	Tue	15:06	-1.1
18	Wed	15:24	-1.1
19	Thur	15:42	-1.0
20	Fri	15:54	-0.9

Head of the Gulf of California:

No chart is yet available for this year. An aproximation can be made by adding 4½ hrs to the San Diego chart and the lowest tides there fall a day ahead of our lows here. If I'm wrong you can blame me.....Nola

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+ NEXT MEETING +  
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+ 15th of Jan. Speaker.....Dr. George Radwin Subject...COLUMBELLIDAE +  
+ 7:30 PM Natural History Museum Auditorium, Balboa Park +  
+ Note: This notice will be the only notice of meetings in the +  
+ future, unless you request a phone call. Write it on your +  
+ calendar TODAY! +  
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GET WELL SOON, JOHN!!

This past month one of our charter members, John Souder was stricken by a severe heart attack. He was sorely missed at our Christmas party though we rejoiced at hearing the news from Norm Currin that John's condition had greatly improved. We hope that by the time you read this, John will be at home and that we'll all be seeing him fully recovered in the near future.

-Carole

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REGULAR MEETING  
November 20th, 1969

Our guest speaker for this meeting was Mr. Kennedy of the San Diego Natural History Museum and his topic was Pholadidae.

The proposed change in our Constitution providing for a Recording Secretary and a Corresponding Secretary instead of one secretary doing both jobs, passed by more than 44 votes well over the 2/3 majority required. The full voting membership being sixty members.





Our President, Nola Michel, appointed John Souder as Mentor-Parliamentarian for the coming year of 1970.

Our annual Christmas Party is scheduled for December 12, 1969, at the CPQ Club Miramar NAS. Reservations must be in by December 1st. Ivan and Helen Thompson volunteered to take care of the Decorations.

Regarding the News of the Western Association of Shell Clubs, our President advised that she had been notified by the Pacific Shell Club that they would no longer be participating. General discussion followed concerning our position. Cliff Ames made a Motion to have a Newsletter published by our Club for our members and no longer be involved with the Western Association of Shell Clubs. This Motion was seconded and passed by all members present. Blanche Brewer was appointed Editor. John Souder, Dave Mulliner, Nola Michel, Carole Hertz and Norm Currin will make up the News Committee.

Our annual elections were held with the proposed slate of Officers as recommended by the Board in October, 1969, being elected unanimously and as follows:

President	-----	Carole Hertz
Vice-President	-----	Nola Michel
Recording Secretary	-----	Barbara Myers
Corresponding Secretary	-	Barbara Good
Treasurer	-----	Peg Mulliner

Voting was by secret ballot.

Carolyn Polonsky won the door prize.

-Barbara W. Myers,  
Secretary.

Mrs. George A. Hanselman  
5818 Tulane Street  
San Diego, Calif. 92122



Mr. & Mrs. Julius Hertz  
3883 Mt. Blackburn Ave.  
San Diego, Calif. 92111





THE

# FESTIVUS

vol. 1, no. 2



## SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968

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vol. 1 no 2

Jan 1970

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+ Next regular meeting - February 19 - 7:30 P. M. +  
+ +  
+ Dr. James Stewart from Scripps Inst. of Oceanography +  
+ speaks on "Dangerous Marine Animals" +  
+ +  
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### THE COLUMBELLIDAE

At our January meeting Dr. George Radwin presented the family Columbellidae - their taxonomy, biology, ecology and evolution. His notes follow, using Taylor and Sohl's "Outline of Gastropod Classification":

Class: Gastropoda, Sub-class: Prosobranchia, Order: Neogastropoda, Sub-order: Stenoglossa, Superfamily: Buccinacea, Family: Columbellidae. Each of these categories may be characterized as follows:

Prosobranchia - Mollusks in which the effects of torsion are retained - i. e. euthyneureus (or figure 8 - twisted) nervous system, the anus and mantle cavity - with associated organs - in an anterior position.

Neogastropoda - Higher (i. e. more specialized) prosobranchs. All marine, most are carnivores, feeding predaceously or by scavenging.

Stenoglossa - Includes all gastropods except for the Taxoglossa (Conidae, Terebridae and Turridae). All have narrow radular ribbon with (usually) 3 longitudinal rows of teeth.

Buccinacea - Includes families, Buccinidae, Nassaridae, Fasciolaridae, Melogenidae and Columbellidae. All have numerous anatomical and biological features in common including:



- (1) A tendency toward the breeding of larval forms within the egg-capsule.
- (2) The development of a much enlarged bipectinate osphradium (the organ thought to be responsible for chemoreception or "sense of smell").
- (3) An extremely extensible anterior (i. e. incurrent) siphon.

The last two adaptations probably developed in connection with a carnivorous feeding habit.

- (4) A relatively short radula with teeth modified for flesh-tearing.

The form of the radular teeth throughout the Buccinacea may be shown to be variations on a single pattern.

Combrellidae - all relatively small animals with many anatomical features in common, including a foot with a very narrow peduncle (stalk), an extremely concentrated nervous system (capable of producing very rapid reactions and movements) and a specialized radular dentition. Marcus and Marcus (1962) have suggested a tweezer - like function for each pair of lateral radular teeth. The median tooth appears to be vestigial.

Combrellid genera Worldwide - species of these genera occupy a great many niches, from the splash zone to the continental slope (deepest record - about 1000 fms). Combrellids are, however, primarily shallow water (0 - 40 fms), full-salinity, epifaunal forms. In the tropics, many species favor hard substrates (coral, coral-rock, coralline algae). In temperate regions, most favor algae as a substrate.

At least four species in three different genera have been known to feed predaceously on bivalves, one on Caprellid Amphipods. Others presumably are also predators.

The genera of the Combrellidae exhibit very diverse shell forms. Shells of species in these genera resemble those of species in the: Olividae (Nitidella, Conella, Pyrene) - Mitridae (Metulella, Zafra), Buccinidae (Amphissa, Rhombinella, Astyris), Terebridae (Aesopus, Mazatlanina), Turridae (Nassarina, Steironepion) and Comidae (Parametaria, Minipyrene).

This diversity in both shell form and niche differentiation has developed in a comparatively short (geologically speaking) length of time. Earliest recognizable combrellids are found in Eocene deposits. Most genera extend no further back than the Miocene and a few are known from no earlier than the Pleistocene.

The choice of supraspecific taxonomic characters in my study are: general shell shape, shell sculpture, special features





(lirations, denticulation, calluses, etc.) and the form of the lateral radular teeth.

In Neogastropods the form of the lateral radular teeth is known to be quite a conservative or consistent character.

The radular teeth of the Combellidae are generally thought to be of little or no taxonomic value due to their supposed similarity from species to species. My investigations have shown that although this is sometimes true, species may occasionally be identified by their radular teeth. More important than this is the value of this character in assigning species to appropriate genera. In addition, species and genera may be definitely placed in or out of the family with the use of the radular dentition. This takes on added significance when one realizes how little value the shell has in this connection.

In conclusion I will illustrate some of the uses of the radula with concrete examples. (Here Dr. Radwin showed slides of paired shells). (Aesopus Metcalfei and A. stearnsi), (Amphissa Laliaeeti and A. columbiana), (Cosmioconcha mitens and C. modesta), (Stieronepion Monilifera and S. Minor), (Nitidella vs. Rhombinella), (Zafrona vs. Anachis).

(Dr. Radwin showed the following slides of type species of Combellid genera from around the world.)

Alia carinata  
Columbella mercatoria  
Euplica turturina  
Graphicomassa ligilla  
Lavesopus spicula  
Nitidella nitida  
Rhombinella laevigata  
Zafrona isomella  
Aesopus sanctus  
Amphissa columbiana  
Anachis scalarina  
Costoanachis gaskoini  
Parvanachis obesa

Bifurcium bicanalifera  
Cilara chrysalloideus  
Columbelliopsis minor  
Conella ovulata  
Cosmioconcha modesta  
Mazatlaniania fulgurata  
Microcithara harpiformis  
Mitrella scripta  
Parametaria dupontae  
Pyrene punctata  
Strombina lanceolata  
Strombina Sincola Gibberula  
Seminella peasei

(Dr. Radwin also showed a marvelous chart of the "family tree" of the Combellidae which he had compiled and photographed. It seems almost incredible that so much information could be reworded on a single slide.)

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#### COLLECTING IN CAYUCOS

While on our vacation during the Christmas holidays, our family spent three lovely days in the Morro Bay area. At the suggestion of Ruth and Ben Purdy, we visited The Shell Shop there and met





its owners, Laurence and Louise Thomas and their son, David. These fine people were most gracious to us and seemed not to mind answering our many questions about motels, restaurants and - most important of all - shelling spots. Their shop is beautiful and has a fine collection of specimen shells for sale, labeled and priced. We stared the periostracum off some of the "raries" with our longing looks. The Thomases suggested that we would enjoy collecting in Cayucos. And indeed we did!

Cayucos, seven miles north of Morro Bay has a sandy beach, the north end of which consists of an extensive rocky area projecting into the ocean. It is not unlike our La Jolla area just south of the La Jolla Beach and Tennis Club - good rocks for turning, busy tidepools and enough surf to insure the collector a thorough dousing at least once during a tide. We collected here for two days and found many shells common to San Diego as well as a number of species new to our collection.

Following is a list of what we observed. Those starred were new to our collection.

<i>Haliotis cracherodii</i>	* <i>Lacuna porrecta</i>
<i>H. rufescens</i> (dead)	* <i>Assiminea californica</i>
<i>Diodora aspera</i>	<i>Bittium eschrichtii</i>
<i>Fissurella volcano</i>	<i>Hipponix antiquatus</i>
<i>Acmaea mitra</i>	<i>Epitonium tinctum</i>
<i>A. pelta</i>	<i>Crepidula adunca</i>
<i>A. digitalis</i>	<i>C. perforans</i>
<i>A. scabra</i>	<i>Erato vitellina</i> (dead)
* <i>A. ochracea</i>	<i>Ceratostoma nuttalli</i>
<i>A. asmi</i>	* <i>Ocenebra interfossa</i>
<i>A. limatula</i>	* <i>O. circumtexta</i>
<i>A. insessa</i>	* <i>O. lurida</i>
<i>Calliostoma gemmulatum</i>	* <i>O. subangulata</i>
<i>C. ligatum</i>	* <i>Acanthina punctulata</i>
<i>Tegula funebris</i>	<i>A. spirata</i>
<i>T. brunnea</i>	<i>Thais emarginata</i>
* <i>Tricolia compta</i>	<i>Amphissa versicolor</i>
<i>Lacuna unifasciata</i> (dead)	<i>Mitrella carinata</i>
<i>Conus californicus</i> (dead)	<i>M. tuberosa</i>
<i>Olivella biplicata</i>	<i>Nassarius mendicus cooperi</i> (dead)
* <i>Pseudomelasma torosa</i>	* <i>Cysticus jewettii</i>
<i>Mopalia muscosa</i>	<i>Nuttallina fluxa</i>
<i>Tonicella lineata</i>	* <i>Cyanoplax dentiens</i>
<i>Lepidochitona keepiana</i>	<i>Mytilus californiensis</i>
* <i>Stenoplax heathiana</i>	<i>Hinnites multirugosus</i> (dead)
* <i>Lepidozona cooperi</i>	<i>Anomia peruviana</i> (dead)
<i>Glans subquadrata</i>	<i>Protothaca staminea</i> (dead)



On our third day in Morro Bay we collected in Morro Bay State Park and enjoyed the squoze of a real mud flat. Between sinking to our knees and losing our shoes we found the following;

Nassarius fossatus (dead)	Mytilus californianus
N. mendicus cooperi	*Modiolus rectus
*Acanthina punctulata	Leptopecten latiauratus
A. spirata	Protothaca staminea
Conus californicus - very	Protothaca tenaxima (dead)
large and worn	Clinocardium nuttalli
Polinices lewisii	Macoma nasuta
Olivella biplicata (dead)	M. secta
Mopalia muscosa	Lyonsia californica (dead)
Mytilus edulis	

--Carole M. Hertz

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#### WHY I BECAME A SHELL COLLECTOR

After fishing for many years (in Northern California for salmon, in the central area for striped bass and for other fish in Mexico) one day, while trolling around a little island in Guaymas harbor, I told Ivan, my husband, to stop - I wanted off on this island. I rolled up the line, put the rod down - and from that day to this, I have never even wet a line to fish.

I got off and in the moss on the rocks, as the tide was going out, I found the cutest tiny shells - cone-shaped - which I now know as Conus nux. When my husband made one more tour around the island fishing, he too rolled up his line, parked the boat and came with me, shelling.

So in time I have made a shell collector out of him and we have gone to no limits for shells - bought them, found them and traded them. Now we surely have a nice collection. When we get all the cabinets made to hold them we hope some of you readers of this paper will come and see them. It is a hobby we will always enjoy and never give up.

#### TRIP TO FIJI ISLANDS

After being coaxed for four years, we finally made a trip to the Fiji Islands to try our luck at getting golden cowries. What a wondrous trip it was! We happened to get on a Pan Am plane going back to Samoa with the Samoans who had been here at the World's Fair (Oct. 23, '66). We surely had an interesting trip.

When we arrived at International Air Port at L. A. we got to see a good-bye party for the people who had entertained the Samoans in L. A. Then we got on board - finally Honolulu -





and after an hour's wait, on to Samoa.

It was 5:00 A. M. when we arrived there. It was raining and as the plane landed, all the lights were on and bands playing. I told Ivan I did not think we would get this big a reception. Of course it was for the Samoans coming home from U. S. A. The police were everywhere. After finally getting a taxi, we went to downtown Pago Pago - only to find that not a cafe or bed could be had. The only hotel was 8 rooms and was taken by the workers on the new hotel that was under construction - and the cafe only accomodated the workers - and if we wanted anything to eat we had to go back to the airport. Which we did.

Got rooms with a family and, after two days and nights in Pago Pago, we were on the last plane to Nadi (a prop-driven plane). We went to a party both nights we were in Pago Pago. We did not get to shell there - it was pouring down rain all the time we were there.

Then on to Nadi. After spending the night at the Macombo there, we went on to Deuba, where we stayed with friends. We had a small boat at our disposal - could only go to the reefs when it was calm - but we got lots of shells. Mailed seven boxes home. The golden cowries we had to buy. They are higher there than here in the states. Cypraea were plentiful, cones also - some Strombus - but most of the shells the natives eat the meat, so were scarce.

The native Fijians were a fine race of people - tall and straight, with smiles and real good dispositions. Very friendly.

I could publish a book on this trip but as I am out of time - and not even a good typist - I must close. We stayed two months and surely were glad to get home. No paved roads, no TV but it was a very beautiful island anyway.

--Helen Thompson

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#### BOOK NEWS

A recent addition to the shell club library is Dr. James H. McLean's newly published book, "Marine Shells of Southern California". This book was published by the Los Angeles Museum of Natural History as Science Series 24, Zoology No. 11. It is soft covered and sells for \$2.10 per copy.

The book covers 318 species found from Santa Barbara to San Diego, and includes species that occur at low tide and in subtidal areas under kelp beds. The species are figured in 54 groupings, and the black and white photographs are the best to be found of Southern California shells. The glossary



of terms is split into three sections, each section covering the terms applicable to one of the three main classes covered by the book, i. e. gastropoda, polyplacophora, and pelecypoda. The definitions are extremely lucid.

In addition to the excellent photographs, the collector will also appreciate the fine descriptions. The format of the book includes general information on structure, distribution, and natural history applying to an entire group, and this is presented under the family heading. Generally, information for each species includes a description, dimensions, general habitat, relative abundance, and geographic distribution. The amateur collector will certainly appreciate the inclusion of ecological data which is often lacking in other shell books.

The collector may be upset by a number of new names for some of the common species, but this is the price one pays for new knowledge and new understanding. In general, there appears to be a tendency to lump, rather than split, species. The technical adequacy of the names will be left to the professionals and to time to determine. It is hoped that other authors will benefit from the fine presentation of this book and that the combination of excellent photographs and fine descriptions will become a standard format for all shell books.

--Jules Hertz

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Faye Wolfson, a charter member of our club, has gone to Auckland, New Zealand, as a biology teacher on the staff of King's College. Her address - simply, King's College, Auckland 6, New Zealand.

Joyce Gemmell, our south-of-the-border member, has had major surgery but is returning home Sunday, Feb. 1. We wish her a speedy recovery.

All membership dues are payable by our March 19<sup>th</sup> meeting. No mailings will be made after that date if the dues are not in. Corresponding membership is \$2.50, single membership, \$3.00 and family memberships \$4.00.

If you know someone who might become a member - if they received a copy of the Festivus - would you please notify Virginia Hanselman?

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Day/Date	San Diego		Guaymas			San Diego		Guaymas	
	PST	Tide	MST	Tide		PST	Tide	MST	Tide
February:					March:				
Sun 15			1424	-1.0'	Sun 1			1218	-0.1'
Mon 16	1336	-0.5'	1448	-1.1'	Mon 2			1318	-1.2'
Tue 17	1406	-0.7'	1506	-1.1'	Tue 3	1248	-1.0'	1400	-1.5'
Wed 18	1430	-0.8'	1524	-1.1'	Wed 4	1330	-1.4'	1436	-1.5'
Thu 19	1500	-0.8'	1542	-1.0'	Thu 5	1406	-1.6'	1512	-1.4'
Fri 20	1518	-0.7'	1554	-0.9'	Fri 6	1442	-1.5'	1542	-1.1'
Sat 21	1542	-0.5'	1612	-0.7'	Sat 7	1512	-1.2'	1606	-0.6'
					Sun 8	1542	-0.7'		

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### MINUTES OF JANUARY 6, 1970 BOARD MEETING

Annual dues are now being accepted. \$2.50 for corresponding members, \$3.00 for a single member, \$4.00 for a family membership. Dues must be paid by the first of March for members to be included in the printed roster. The following are Presidential appointments: Editor - Blanche Brewer, Telephone Committee - Ruth B. Purdy, Chairman, Hospitality Committee - Blanche Brewer, Chairman, Dr. George Radwin, Library - Jules Hertz, Chairman, Newspaper - Nola Michel, Chairman.

Old Business Board recommended that instead of our usual \$50.00 donation to the Veliger that we send \$25.00. This donation was cut in half because of our independent news venture - which will be printed every month instead of four times a year and therefore will be an additional expense to our Club. Estimated cost - approximately twelve times a year at about \$20.00 each (\$240.00) plus mailing expense - about \$40.00. Our 200th Exhibit in the Museum must be taken down this month - Determine a date and time etc. Constitutional Change - copies will be distributed at the February meeting.

### New Business

#### Programs for 1970

January - Dr. George Radwin, Columbelloidae"

February - Mr. James Stewart, Scripps Inst. of Oceanography, "Dangerous Marine Animals"

May - Shell Club Auction

September - Party - Oriental or Mexican Fiesta

December - Christmas Party

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### REGULAR MEETING January 15th, 1970

Dr. George E. Radwin, Curator of Marine Invertebrates, San Diego Natural History Museum, was our guest speaker and his



topic was Columbellidae.

Treasurer's report as of December 31, 1969 indicated \$189.00 in our Treasury.

Old Business:

The Executive Board recommended a contribution of \$25.00 to the Veliger. The motion made by Nola Michel and seconded by Dr. George Radwin was carried unanimously.

It was decided to take down the 200th Exhibit in the Museum. Everyone with material in the exhibit was asked to be at the Museum at 9:00 a. m. on Saturday, Jan. 24th. Part of the Exhibit will be moved downstairs. The display cases on loan from Scripps Institute of Oceanography are to be stored in the Museum for Scripps according to an arrangement made by Dr. Radwin with Don Wilkie.

Re: the proposed shell project discussed at the October mee meeting, we were informed that the Museum was planning future extensive changes in that area. Therefore this project is discontinued.

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Twila Bratcher gave a short report on Terebra Africana - variegata.

Missing - Vol. 11 (July, 1968) and Vol. 8 (July, 1965) of the Veliger, in our library.

New Business:

Betty Baker advised that the Shell Club of Australia sent a box of shells for our Auction. Secretary to send a letter of appreciation. It was suggested that we reciprocate. Bring your shells to Betty Baker or one of the officers.

Bill Woods will be in charge of Publicity.

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John Souder is off the sick list and was present at the meeting. Welcome back, John.

Rose Burch, a welcome guest from the Club, won the shell drawing.

Helen Thompson and Jane Stotter volunteered to bring cookies for the February meeting.

--Barbara W. Myers,  
Secretary





THE

# FESTIVUS

## SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968

PRESIDENT: CAROLE HERTZ  
VICE PRESIDENT: NOLA MICHEL  
RECORDING SECRETARY: BARBARA MYERS  
CORRESPONDING SECRETARY: BARBARA GOOD  
TREASURER: MARGARET MULLINER  
EDITOR: BLANCHE BREWER



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VOL. I

FEBRUARY 1970

NO. 3

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+  
+ Program for March 19 = Twila Bratcher and Billee Dilworth on +  
+ Micronesia. +  
+ +  
+ Deadline for dues - March 19. Your name should be in by then, +  
+ to be included in roster and on the Festivus mailing list. +  
+ +  
+++++

### DAINGEROUS MARINE ANIMALS

James Stewart of the Scripps Institute of Oceanography was the speaker at the February 19<sup>th</sup> meeting of the San Diego Shell Club - his subject, Dangerous Marine Animals.

Jacques Costeau's invention and development of the aqua lung has been a marvelous, even fantastic, extension of underwater exploration. Its use is now very common and SCUBA diving has become the ultimate accomplishment of a steadily increasing number of swimmers - especially those swimmers who collect shells.

With this increased mobility and depth range, new, potentially dangerous encounters are multiplied. Using a film, Mr. Stewart introduced some of these animals, to be avoided and respected for their armament.

A thousand feet of shelf, with an average depth of thirty-five feet, extends from the shoreline of La Jolla Cove. The shelf ends at a sea cliff where the water becomes 250 (or more) feet deep. On this shelf hundreds of Indian stone bowls, from cup-size to large salad-bowl dimensions, were discovered. On the terraces of the cliff at a 60-foot level, oak tree root remains were found, aged 6000 yrs. At 130 feet they were 8000 and at 170 ft., 13,500 years old.

In this area stingrays, "as thickly placed as paving stones", have been observed. They are a prime threat in the local area. By using



a "plumber's friend" to hold a small stingray flat on the sand, it was possible to show how they used their tails to direct the thrust of the poisoned dagger that is their defense. Most people think the barb is placed on the end of the tail but it is about one-fourth the length of the tail below its end. When the barb emerges in the thrust, the loose skin presses against the poison sac and the wound receives the poison. It is a protein poison and lessens in potency as time passes after the wound. However, it is a painful wound and should be treated by immersion in hot water as soon as possible and be checked by a doctor soon after.

Sculpins, prized as food, carry their poison in their dorsal fins. When erected, they are viciously long and these also eject their poison much as the rays do. This particular fish is plentiful in the area of the outflow of the Tijuana river channel. An outfall of raw sewage is carried to sea here and bacteria must be considered as a very serious accompaniment to a sculpin wound.

Sea urchins are culprits. The California scorpion fish also causes painful wounds.

Spines of the Stone fish and Lion fish bring systemic poisoning which is sometimes fatal.

In other waters of the world an encounter with a sea snake may result in intense muscle pain and respiratory failure.

Fireworms and firecoral bring poison and pain.

Great jellyfish maneuver in the sea, some with thread-like lines a hundred feet long, poison-barbed and ready for prey, that when caught, are reeled in and consumed.

The coelenterates and the hydroids attached to rocks, some starfish, take their toll of careless steppers. Shells themselves, as the comb snails, are in this list of danger and among the Conus are some of the deadliest killers. There is one (of several) Conus geographus, whose radular thrust can cause almost immediate death to man. (Suspect all cones. Pick them up by their tops and never put one in a pocket!)

So we are cautioned to protect our feet with stout covering - never to probe a dark hole with the hand - to enter the sea quietly, scuffling the feet as a warning (to stingrays, particularly). A beached jellyfish, though dead, is still a source of danger, its tentacles still potent with its deadly poison.

We are assured that the moray eel will not attack but he likes to back into a hole and face an intruder.

Sharks and such were mentioned in passing but no one would be careless about them! Alertness is the key word, with knowledge of the likely whereabouts, the armor and danger potential of these marine animals highly essential!

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## ABOUT OUR FRIENDS, -EMMA AND ART WEST

About three months ago a new shell shop opened in our area. Seashell Treasures, at 715 Glover Ave., Chula Vista, owned and operated by Emma and Art, is certainly a sheller's delight. Besides the very many beautiful shells - with a liberal sprinkling of "rarities", the Wests are carrying all manner of shelling accessories from plastic boxes and dental picks to "spritizers" for the smellies. A complete book department is rapidly growing. Art says he will "try to carry every book out on mollusca." A catalogue is forthcoming.

I'd always thought these two people were more than busy enough with Artcraft Printing re: our distinctive Club stationery and newsletter masthead. Why a shell business too?

For Emma, the shell bug bit when she was a little girl. Her mother had a large collection and the family collected often, the children donating to their mother's collection. As soon as Emma could, she began her own collection which she treasures still, separate from the shell shop. Many of her shells have amusing stories as part of their value in her collection.

Art was never interested in shells until he joined the San Diego Shell Club, but always collected for Emma when he went diving. His hobby has always been printing. His dad was a professional printer and Art and Emma began pursuing his hobby in earnest when they moved to Chula Vista in 1956. They do only jobs that they find interesting - and our Club work which, interesting or no, they have graciously and creatively done for us. Art developed a love of diving while in the Navy from 1934-38 and again in 1942-46 - both times as a deep sea diver. This was the 'hard hat' variety and Art says he didn't like SCUBA at first. However, he obviously changed his mind since he had their son John, now 21 and in Vietnam, in SCUBA when he was just eight years old.

Emma and Art say they have "itchy feet." The family took many trips into Mexico before WWII when John was just a tot. These were in the pre-paved road days and the Wests have had many adventurous hours on railroad trestles, ferries and the like. It was in 1968 that our friends took their first big trip, an exciting three month tour to Tahiti, Bora Bora, Moorea, Samoa, Fiji, New Caledonia, Ouvea, and Australia. Art flew from island to island with his 22 lb. weight belt strapped firmly to his waist - not a security blanket but a saving on their overweight luggage.

In New Caledonia they swam with sea snakes. In Australia they sat in a small boat with sea snakes and sharks all about them. In Ouvea they stayed at the only hotel on the island - two grass shacks owned by a Frenchman who was the only foreigner on the island. Dinners, by candlelight, were eaten with the family. Each day a fresh supply of shells were brought in from the beach and spread over the floor for beauty. Poor Emma hardly had time to eat for picking up lovely beach specimens of Epitonium palleasi etc. from the floor. (These carpeting shells from Ouvea are still in her collection.)





Art has promised to write of their adventures on this and other trips, for future issues of our newsletter. We will be watching for them!!

--Carole M. Hertz

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### SOME THOUGHTS ON COLLECTING RARE SHELLS

Almost every collector has, at one time or another, met with the frustration of trying to add a particular rare shell to his collection. Anyone who has ever tried to acquire a Cypraea aurantium, a Trophon catalinensis or any other rare shell knows how exasperating the search can be. Especially when other collectors, with no apparent effort on their part, seem to have no difficulty in getting the very shell you want. It is not a matter of rivalry with your fellow collectors. Very few collectors, if any, go after the rare ones because of a feeling of rivalry. However, the very fact of rarity creates a form of rivalry for the possession of a shell, because there are not enough of them for everyone who may want a specimen.

One such experience began for us in 1962, when we first saw a specimen of the volute, Cottonia nodiplicata, in the collection of a friend in Newport Beach. It was a shell about eight inches long and to us it represented the virtually unobtainable, so we decided to try to get one for our collection.

In the next few years we wrote scores of letters to collectors and dealers throughout Australia trying to get one. We even made the supreme sacrifice of offering the only Cypraea aurantium we had at the time as part payment. In almost seven years our nearest approach to the goal was the offer of a dead collected specimen as an even trade for the Cypraea aurantium, which we refused. Since, in the interim, two of our collector friends had added nice specimens to their collections, I was beginning to feel a twinge of inferiority about the whole thing.

This is the way matters stood when we went to Asilomar to attend the second annual meeting of the Western Society of Malacologists last June. We started the trip two days early so we could do a little shelling and visit a dealer or two along the way. Among other stops we made was one at the remarkable establishment of Lawrence Thomas in Morro Bay.

After nearly seven years of trying to get a Cottonia nodiplicata, of any size, we were completely surprised when we saw the largest specimen we had ever seen in the large glass case on the back wall of Mr. Thomas' shop. It was such a large, outstanding specimen that we could hardly believe it would be for sale, thinking it must surely be on display from Mr. Thomas' personal collection. However it was for sale and our long search was at an end. The shell measures fifteen and seven-sixteenths inches, was live collected and has a fully developed lip. It is larger than the one mentioned in Van Nostrand's Standard Catalogue of Shells, second edition, by Robert J. L. Wagner and R. Tucker Abbott, which was the largest on record at the time of publication.





Most of the rare shells in our collection, as in other collections, were gotten without special effort to do so but merely by taking advantage of an opportunity when it arose. I am convinced that this is the best way to add rare shells to a collection. It not only saves time and effort but is much easier on the nerves.

Ha! Does anyone know where we can get a really good Strombus goliath?

--Clifton L. Martin

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# A FLORIDA SHELLING TRIP IN 1967

It always seemed like we had to be in the sea sometime close to the break of dawn, to get the real low tides and find many seashells. So we arose at 5:00 in the morning, fixed breakfast and also a lunch, for we always stayed until the high water forced us to go home. We drove and pulled the boat on the boat trailer, for 33 miles, then launched it at Sugar Loaf Shores and then went out about ten miles into the Gulf of Mexico. It was very shallow and one has to follow markers to get out there. Once Ivan was going as fast as that 35 horse motor would take us and got in the shallow water and stopped on top of a sand bar. So he told me to get out and help push the boat off the reef. Well, I did and we both pushed and pushed and finally got it off but I could see us there all through the low tide. We got going again, at a much slower pace, and got out to the outer side of the reef. The flats were sticking up all around us, so we anchored the boat and got out with shorts and wading shoes on. We never went barefoot - too many sharp things - coral, among the many dangers. We only went a short ways and came to a nice Strombus costatus, a real pink colored one. I let out a yell and the race was on, as we took another couple along and tried to to see who of us could find the prettiest one. We found red ones, lavender ones, white ones (albinos) and also I found a yellow one. Never any two are alike. Then the tide turned and we searched the reef for murex and other shells. In the sand there were many shells Busycon contrarium (conrad), Busycon pyrum (Dillwyn), and Busycon perversum eliceans, (Montgomery). These are in the sand mostly, eating the cockle shells of all kinds. They were all sizes and the apertures were some of them bright yellow and oranges. We, by that time, had brought the boat to the way to return home and anchored it to have lunch but you can bet the tide had turned, and was coming in at a rapid pace, before we stopped to eat. As we were sitting in the boat lunching, I spied two somethings that looked something like a couple of sponges, so I got right out to investigate and, coming closer to them, it was two Pleuroploca gigantea, which seemed to be talking to one another. They were on their feet and moving back and forth in a strange motion, but at least four inches apart. So maybe they were getting ready to try to eat each other. I have seen smaller ones being devoured by larger ones. But these two were about the same size. So I got them both, one in each hand (they were about fourteen inches long) and started back to the boat, which was about a quarter of a mile away and it was some ordeal getting them back. I have them to this day minus the animal. But with the operculums on cotton.



That day we found Fasciolaria hunteria, (Perry) Fasciolaria tulipa, (Linne) and we must have seen the hunteria by the hundreds. They, too, devour each other and most anything they can catch in the sea. There were many Conus spurius atlanticus (Clench) also in the sand on sandy places. On the reef we found Vasum muricatum (Born) - very large ones - some as large as five or six inches. Most of the large ones are wormy at the apex. Then the hungry Murex pomum, (Gmelin) started to move around looking for food. We got maybe as many as four of them, between both of us. They are covered with moss and very hard to see unless one has moved, then the shape comes in your view. Then we returned to the boat and left to go the same route back. There is no other way but Hiway 1 down the Florida Keys. It goes from Key West to Maine. We were tired and sunburned but well rewarded and I have the shells to prove the trip.

--Helen Thompson

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#### BOOK NEWS

The Shell Club recently acquired the newly published, soft covered book, "A Collector's Guide to West Coast Chitons," by Glenn and Laura Burghardt. This book was published by the San Francisco Aquarium Society, Inc. in November 1969 and is available at \$4.60 per copy.

This book compiles and describes the chiton species found on the West Coast of the United States and Canada. It was not intended to be a complete compilation, but in describing approximately 100 species it is more complete than anything published since the turn of the century. The cover, which contains a much enlarged color photograph of Mopalia lowei, is spectacular. The written descriptions of the species are extensive and will be of valuable aid to the scientific collector. These descriptions are accompanied by 80 color photographs, which to put it kindly are of very limited use. Aside from showing the general color of the species, these photographs are generally blurred and show very little detail. It appears that the specimens were wet when photographed.

There are several other things about the book which may disturb the average amateur collector. Although range and type locality are given for each species, the habitat and ecology of the animals is not discussed. These are of extreme interest to collectors, and perhaps in this regard the photo descriptions and credits in the back of the book will be of most value. The authors do not describe the insides of the chitons, since this requires disarticulation of many fine specimens which they, as lovers of beauty, are against. From the scientific standpoint, this lack of internal description (color, size, shape etc.) detracts from the overall value of the book. The cross-reference between descriptions and photographs is unwieldy and could be greatly improved by having the species' names on the photos.

Despite the drawbacks enumerated above, this book will be very valuable to the chiton collector. It is hoped that future editions will correct some of the deficiencies.





The San Diego Shell Club Auction will be held on Friday evening,  
May 15th at the home of Cliff and Waneta Ames, 6447 Celia Vista Drive.

Please bring shells for this auction to the regular meetings or to the  
home of any of the Board members, Carole Hertz, Nola Michel, Peggy  
Mulliner, Barbara Myers, Barbara Good, or John Souder.

Kindly donate only specimen shells with locality data. They need not  
be rare shells but should be in fine condition.

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Day	San Diego	Puerto			Guaymas
Date	<u>PST</u> <u>Tide</u>	<u>Penasco</u>	<u>MST</u> <u>Tide</u>		<u>MST</u> <u>Tide</u>
FEBRUARY:					
S 21		1920	-2.6'		
S 22		0740	-3.0'		
		1950	-2.5'		
M 23		0800	-3.7'		
		2020	-2.1'		
T 24		0820	-4.0'		
W 25		0840	-3.8		
T 26		0910	-3.0	0542	-0.5'
F 27				0636	-0.5'
S 28				0748	-0.5'
S 29				0948	-0.5'
M 30				1136	-0.7'
T 31	1124			1236	-0.8'
MARCH:					
W 1	1212			1324	-0.8'
T 2	1254	1800	-2.8'	1400	-0.6'
F 3	1330	0630	-2.6'		
		1830	-4.0'		
S 4	1406	0710	-4.0'		
		1910	-4.2'		
S 5		0740	-4.8'		
		2000	-3.8'		
M 6		0800	-5.6'	0412	-0.5'
		2030	-2.8'		
T 7		0820	-5.0'	0448	-0.7'
W 8		0845	-4.0'	0518	-0.7'
T 9		0920	-2.4'	0600	-0.6'
M 20		0710	-3.2'		
T 21	0300	0735	-3.9'	0342	-0.5'
W 22	0336	0800	-4.1'	0418	-0.7'
T 23	0418	0825	-3.9'	0454	-0.9'
F 24	0506	0850	-3.4'	0542	-0.9'
S 25	0600			0636	-0.8'
S 26				0748	-0.7'
S 27				0912	-0.5'



RUGULAR MEETING  
February 19th, 1970

Treasurer's report - \$195.00.

January minutes as printed in The Festivus, approved.

Deadline for 1970 dues - March 19th.

Librarian's report - new material received:

1. Catalog of minerals, fossils and shells to be auctioned March 5th, 1970 at Southbys, London, England.
2. Two issues of a new Italian magazine on shells. Subscription for one year \$6.00 - printed in Italian.
3. Issues for three years of the Tabulata. Several issues of the Nautilus. Issues of Western Association of Shells from 1961 to date. All donated to the Club by Kay Webb.

Program for March - Twila Bratcher and Billee Dilworth - Micronesia.

The President made an appeal for articles for the Festivus.

John Souder advised that the following issues of National Geographic would be of interest to all members-

April, 1936; June, '42; July, 48; July, 49; May, 67; March, 69.

Mr. James Seay won the shell drawing.

Cookies for March - Barbara Myers and John Souder.

--Barbara W. Myers,  
Secretary

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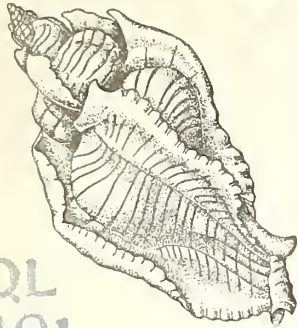
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+  
+ Attention: Corresponding members - last call for dues (\$2.50). +  
+  
+ Make checks payable +  
+  
+ San Diego Shell Club, Inc. +  
+  
+ Mail to: +  
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+ San Diego, Calif. 92109 +  
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# FESTIVUS



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## SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968

San Diego Museum of Natural History, Third Thursday

President: Carole Hertz  
Vice President: Nola Michel  
Recording Secretary: Barbara Myers  
Corresponding Secretary: Barbara Good  
Treasurer: Margaret Mulliner  
Editor: Blanche Brewer

Vol. I

April 1970

No. 4

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+ Program for April 16th, 7:30 p. m., Museum Auditorium +  
+ Anthony D'Atillio speaking on Periostracums of Gastropods +  
+ BRING SHELLS FOR AUCTION! DEADLINE THIS MEETING +  
+ Festivus - Mrs. Virginia Hanselman, 5818 Tulane Street +  
+ San Diego, California 92122 +  
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### HOLIDAY IN MICRONESIA

To be among the first travelers to use a new air service to the E. Carolines was the happy experience of the sisters, Billee Dilworth and Twila Bratcher in winter holiday time. At our March meeting they showed us slides of scenes in the islands and of specimens taken on this trip, accompanying the showing with a lively discussion. On a short stopover in Hawaii they went on a dredging trip with Ellis Cross, working water 500 feet deep. Strombus hawaiiensis, Cypraea granulata and Murex pele were some of the specimens secured. Their destination was Ponope, E. Carolines but their first stop was at Truk where they spent two days. They found no hotel in Truk but made-do in a more or less primitive way in a quonset house used by the young resident doctor. It is possible to rent a car and tour this island. Pollution of the bay waters by Bangos (outdoor toilets) over the water makes shore area collecting impossible. The natives are food gatherers rather than growers. Pepper trees and cocoa, introduced to the island, grow very well and the annual rainfall of 214 inches makes them and the native flora lushly productive. Atoll island was next and as they came into the harbor the entire porpoise population (perhaps a hundred) came out to meet them, escorting them to shore. The chiefs made them welcome with palm-leaf baskets filled with drinking coconuts. Here they took many underwater pictures - some, of each other working. They wore jeans and shirts to protect themselves from the coral. The coral is menaced by the Crown of Thorns starfish. All Western Pacific



islands are affected, some more than others. (Hiram Fong, Senator from Hawaii has just asked for money to fight this menace in Hawaiian waters where a dangerous increase has recently occurred. They are featured in the March, 1970 issue of the National Geographic magazine.) These starfish can cause very painful wounds. The natives say if you step on one turn it over and step on the underside.

Underwater, were great piles of Tridacna shells, a source of delicious meat. Among specimen shells taken were Conus marmoreus, Cypraea lynx, C. tigris, C. caputserpentis and C. hirundo neglecta.

Back to Ponope where friends, Anne and Dick Willis, in their yacht, "Rambler", met the plane. The great rock which looms over the harbor is known by several names: Sokel Rock, Takaiau (tent) Rock and Tonachau.

Here also, they took many pictures - of the people, the native plants, and most interestingly, evidences of an ancient occupation by a people unknown.

Figs, yams and coconuts are staple foods of the land area. The yams grow to 50 pounds and are planted near a tree. First, however, they kill the tree, then bury the yam under rocks to keep them from being eaten by the children and the pigs. The yam vine climbs the 20 or 25 foot tree, its blossoms like pink morning-glories. Billee observed that the children seemed to shift for themselves. They just learn early how to gather food, one supposes.

An annual feature of life on Ponope is the division of the yams and the pigs. All areas don't have both. The meat and yams are placed in portions on banana leaves on the ground and a council determines the order of choice.

The living is easy, food is abundant and the coconut palm furnishes many things for their use. They use mangrove wood, working it into many useful articles. Among shells taken here was an 18-inch winged oyster. Within the encircling reef of Ponope are the remains of the ancient occupation mentioned before. Basalt "logs" are placed, one on top of another, in thick walls and on the coral foundation seemingly to add strength and make a base for growth. The logs are large, single basalt crystals, like the Devil's Post Pile of California and too heavy to have been transported by canoe (as known today) from their source, 30 miles away. The Smithsonian Institute has made an investigation of the area which is known as Nan Madol.

The slides were great - graphic and beautiful - one, of a silken, rosy sea, ineffably so (to this viewer).

Dave Mulliner's slides of some microscopic beauties were fantastic! Shown were: Parvaturbo acuticostatus, Vitrinella oldroydi and Acteocina harpa.

Donna (Souder) Christian's slides were tremendously artistic compositions. She has made a wonderful start in the fascinating art of photography. Mrs. Christian is a student of photography.

#### NEWS FROM FAYE WOLFSON

Five hours out of Los Angeles, 30,000' above earth. Suspended in unreality watching "Finian's Rainbow" in a skin of metal that seems to be bouncing along a bumpy road. Stretching, my head turns to the window





and an expanse of sky. Stars. I follow their chain - the Big Dipper. But the bowl is squashed. Into a diamond...no dipper, this. !!! No dippers for this while to come!

But there are dawns. A most satisfying one for my first above the clouds. And, with the earliest light, Fiji. I checked into the Mocambo, near the airport. (Had asked my travel agent for an inexpensive place. This was the highest, I later learned. Also, they have cheaper rooms than I got. But it was nice.) Morning climate was delightful, warming and dampening as the day wore on, but not uncomfortable. I went to Nadi, a small Tijuana-like town. With a difference in costuming...most of the women wear saris, and beautiful they are. The Fijian women also have a colorful costume of a long solid-color skirt topped with a tunic which is often a bright print. And the smiles! Everyone smiles at you, beaming and grinning. Somehow with this they maintain a warm and dignified aloofness. I did a bit of shopping, then rode the open bus back to the road that leads to the hotel, walked the  $\frac{1}{4}$  mile, took a swim and a nap and, in the evening, attended a meke - a feast put on by a small village and followed by songs and dances. This was interesting, but not noteworthy. The dignity kept it from being shoddily commercial and the food was lavish and excellent, but...

I've got a sort of informal roving commission to check up on salt-marsh plants for a group at Scripps, so I had called the Herbarium in Suva and been put in touch with a man at the Agriculture Dept. He suggested that I go, if I wished to, into the field with one of their groups on Wed. So Tuesday at 9, against the advice of the hotel's tourist agent who urged me to take the air-conditioned bus, I boarded the regular bus for the long ride to Suva. That's the one that's aired - and you have to become conditioned, as there's no alternative. These buses are open, the roads, well graded and topped with crushed rock, are nevertheless dusty and the speed is slow. Most of the passengers made the whole journey, but the constant stops and comings and goings provided much interest. The countryside is beautiful and, as we neared the half-way mark, I began to understand how they could have insisted that the incredibly green western end of the island was the dry side! The grassy, bush-studded fields and slopes began to give way to heavily forested dense jungle. Vine-covered trees and vine-covered vines! Bananas and coconut palms, tree ferns and, increasingly often, vast mangrove forests. I learned that the small bird that I saw literally everywhere was a mynah, brought from India. That the small animal often scurrying across the road was a mongoose, originally brought to cut down on the rat population and now so successful that it is sometimes considered a pest. That the agaves that startled me in one small stretch were imported. (And I learned that I was coming down with a really horrendous cold.) As we approached Suva, it got grayer and grayer and soon it was raining. Not that I cared. I just went to my hotel and was in bed at 4:30, staying there till it was time to get ready for my field trip, still feeling lousy but determined. So, Wed. AM found me setting off with 4 Fijians to a spot 14 miles out of Suva where the road ended at the foot of a rustic bridge leading to a Fijian village - the real thing this time. We exchanged greetings and then headed out across a 30,000 acres salt marsh. In the heat of



the sun, sloshing through puddles and ponds, following cow trails that were undiscernible under the dense vegetation, plowing through shoulder-high grasses, bouncing on a trampoline of matted plants. I was soon drenched and awash in my own sweat, feeling weak and longing for the shade of the mangroves. After about 3/4 mi. of this, the men suggested that I rest and wait for them. Which I gratefully did, lying down on the damp, leaf-covered ground in the sweet shadow of the trees. Soon one brought me a coconut, prepared it with his machete. I drank and revived. This part of the journey was thru the forest and, after a second coconut, I felt well. They were making a survey of the flora as FAO is going to drain the swamp to make way for rice fields and all this while, they had been collecting for me as well. When they finished, we walked on, again thru open swamp, until we came to a small farm where, I was told, I was the "2nd white visitor". Very ceremonious introductions were made and, within minutes, I was asked if I would like to take pictures of the family; then if I would like to have my picture taken with them. There was an old man, his wife and quite a number of boys, all or most of them grandchildren. The older boys spoke English, but most of the laughing conversation was in Fijian. Another coconut was brought out, then a watermelon. Husks and rinds were thrown (after the cat and chickens had a chance at them) into the mangrove channel at our feet. A rambunctious 7 year old dove into it every few minutes to show off, swimming or poling a small wooden boat. We grinned and talked and listened, more pictures were taken. I was invited to ride down the channel into the river. Delicious in the dense shade. On our return, lunch was ready. A legless table was placed on the ground, the men were given a kind of stew, but for me there were prawn sandwiches, the crusts neatly trimmed, the tiny pink shrimp (caught in the channel) surrounded by tomato and onion slices. Topped off with a tin cup of tea.

Reluctantly, we took our leave. It had begun to rain, sporadically, but as we entered the car, I got a taste of a true tropical deluge and was glad to have missed its force. After arranging for the disposition of "my" specimens - I hadn't laid a finger on them, mind you, I returned to the hotel to indulge my illness for another miserable night. But what a day! Unforgettable.

Having decided that my cold was air-conditioner-induced, I returned to the west end of the island by taxi, heading for Lautoka, a small town 20 miles from Nadi. The ride was slow, pleasant and uneventful. I had hoped to do some intertidal collecting, but the tide and time conspired against it. This time I was booked into an inexpensive hotel - no air-conditioning, no phone in room, no reading light. But the open windows overlooking a small lawn at the edge of a mud-flat on the edge of the sea informed me for the first time that I was, indeed, in the South Seas and (except for the swamp trip) part of the environment at last. I loved it. The room plus breakfast cost \$4 and as a bonus at breakfast, I met a delightful New Zealand couple whose plans for the day were the same as mine: to take a one day cruise to a small island. And that is another story.

In a lovely yacht, possibly 100', we sailed over a calm sea - opalescent as I'd thought only the Gulf could be, past postcard-picture islands (some stamp-size) for 2½ hours, reaching a larger version of a typical Hollywood-dreamed tropical shore. Only for real. Disembarked





at a lovely hotel where I immediately changed and hit the water. Lovely. An astonishing number of cucumbers, very elegant anemones and, on and under every stone and coral clump, money cowries! I looked and looked. (I also itched and itched, even under water, from the heat of the sun.) And afraid that I'd miss lunch, I tore myself away. And as soon as possible, plunged in again. It was so hot! I kept urging myself to get out, be leisurely, take a shower, have a drink. And reached shore to find the party boarding for the return trip! I rushed for my clothes, persuaded the bartender to let me take a glass aboard and ran (what a picture I must have made) for the skiff, mask, snorkel, fins, camera flapping on one side, but the luscious fruit drink with its orange slices and maraschino cherries firmly and gratefully clutched in the opposite hand.

And Sunday, Feb. 1, I left Fiji and arrived in Auckland. Thirty hours ago, and already there's too much to write for this installment!

--Faye Wolfson

#### AN INTERESTING ANNOUNCEMENT

Back in the early 1900's our club member Edwin C. Roworth, while yet a young lad growing up in the area around Rochester, New York, began a small collection which, with the passing of time, he has patiently and without fanfare built up to such an extent that it could now be reckoned as being one of the most extensive and unusual of any of the private museums of the country.

While most people are specialists, in that they normally confine their efforts toward acquiring only shells or minerals or some such group, Ed's interests were more universal and included shells (marine, land and freshwater), corals, fossils, rocks and minerals, sands and soils, land and sea life, Indian and other artifacts, curios, and intriguing objects of every kind from all parts of the world.

At latest count the total number of specimens was well above 100,000 and there were so many of them that Ed was getting crowded out of his three bedroom home and garage at Cardiff-By-The-Sea. For example he had at least 320 species and races of Cypraea, 200 of Conus, 200 of Mitra, 280 Muricidae and 1200 species of land shells - to name only a few genera.

An important fact also is that all specimens were listed and recorded on specially designed forms filed in loose-leaf binders for ready reference. Which task obviously entailed the doing of a considerable amount of detail and typing work by Ed over the years.

In this connection the question arises sooner or later as to just what the ultimate disposition of one's collection is to be. Ed tells us that he has recently solved this problem coincident with the arrival of his 81st birthday. Unknown to any of us he has been working days and evenings throughout January and February to check and pack all these accumulated treasures. With the result that more than 100 cartons of many sizes with a total weight of 4400 pounds were picked up by a large Mayflower van on March 5th for subsequent delivery to the fortunate new possessors, the Arizona State University at Tempe, Arizona. Ed is very happy knowing that his lifetime collection is now safely in the hands of one of the most progressive and prestigious of all the top educational institutions worldwide where it will be available for display, study



and research purposes.

Ed expects to continue his memberships in our club and other scientific organizations and we can be sure that he will not give up shell collecting altogether even though he has various other activities and hobbies which naturally will take up quite a bit of his time. And of course we all know the truth of the old saying among shell enthusiasts that "Once a collector - always a collector."

#### BOOK NEWS

In recent weeks, the San Diego Shell Club library has received several additions generously donated by its members. Kay Webb kindly donated a complete set of "News of the Western Shell Clubs" covering the years 1961-1969, volumes of "The Tabulate" from 1967-1969, and volumes of "The Nautilus" from July 1962 - July 1965. John Souder has given 14 issues of "The Philippine Shell News" from the years 1958-1961. All of the above make for hours of interesting reading and are welcome additions to our library.

In addition, the library has received two issues of a new shell magazine, "La Conchiglia". This is a beautiful, illustrated magazine with some interesting articles. When their English language version is released, it could be a fine addition to our library.

--Jules Hertz

#### FROM "SEA SECRETS"

Question: My friend said that a squid and a cuttlefish are the same thing. I believe that a cuttlefish has a cuttlebone, while a squid has no bone structure at all. Who is right? S. K., Forest Lake, Minn.

Answer: Neither of you is right. Squid belong to the cephalopod order Teuthoidea and do possess an internal shell. This shell or gladius, however, is paper thin and made of chitin.

Cuttlefish belong to the order Sepioidea, specifically to the family Sepiidae, found only in the old world. They possess a thick calcium carbonate shell which aids in buoyancy control.

Unfortunately, these names have been confused so often that even many dictionaries are in error concerning the use of these terms.

(Taken from "Sea Secrets" for March, 1969, published by the International Oceanographic Foundation, 10 Rickenbacker Causeway, Virginia Key, Miami, Fla. 33149.)

#### ANOTHER DAY GETTING SENTIS PECTENS

We were off Little Duck Key, Florida on the gulf side when the water started to go out and in a while the coral was all exposed and we would get a shovelfull, deposit it on the front of our glaspar boat, and then look through the coral for sentis pecten, Chlamys sentis Reeve. You cannot tell them from the roots of the coral unless you see them open their mouths and see the bright colored animals. They come purple, white and orange color and also some are a mixture of the colors. You get some fire coral, and that burns. We had nothing in the line of oil, having left the suntan oil at home. But I found a jar of mayon-





naise and we tried that. It sure did take the burning out. We thought it was the glass worms and not the coral that made our hands sting. But anyway, one or the other. Or maybe both.

We got some of these pectens and then went on to look for Triton femorale. It is Cymatium femorale Linne which also lives in the coral and on the edges of the deep water. If one is lucky he may find one. What a thrill to find one, sitting partially buried or maybe in plain sight, with that angular top showing. We have found them sitting on top of coral and under the coral and even moving from one place to another. They are easy to see when they are or have been moving. But we searched for two years before finding any of them. We have them in all stages. Making a new lip, no lip, and with a lip just like tissue paper.

Just as hard to find is the Cymatium cestatum Born, Cymatium caribbaeum Clench & Turner and the Cymatium chlorostomum Lamarck. Each can be found but is scarce, and takes many days of searching. We almost spent every time the tide was real low, searching for the cymatiums - day after day, Ivan was so good at first. I could not find one to save me. Then I got my first one all by myself. I got the shivers it was such a large and beautiful one. Then I had broken the ice and could hold my own with Ivan after that.

--Helen Thompson

#### EXCERPTS FROM MINUTES OF MARCH, 19

Treasurer's Report: Balance on hand Feb 28 - \$161.00

Old Business: The minutes of the February meeting as printed in The Festivus were approved. The President reminded members to bring shells for the May auction to the next meeting or to any board member.

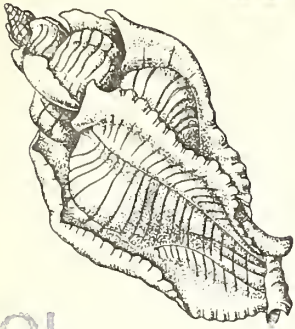
New Business: John Souder told of the formation of a new organization, Hui-O-Hawaii of San Diego, which is open to all San Diego residents interested in Hawaiian culture. A Luau will be held in July which will be open to the public. The shell drawing was won by Helmut Meier. Cookies for April will be provided by Virginia Hanselman and Barbara Myers.

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 + SPECIAL NOTICE. To all corresponding members: +  
 + We invite you to contribute to our magazine. Our deadline +  
 + is the fifteenth of the month +  
 + Address: +  
 + Mrs. Virginia Hanselman, 5818 Tulane St. San Diego, Cal. 92122 +  
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THE

# FESTIVUS



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Vol. I

May 1970

No. 5

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+ SHELL AUCTION AT HOME OF +  
+ CLIFF AND WANETA AMES MAY, 15 +  
+ 6447 CELIA VISTA DRIVE +  
+ +

+ PUBLICATION ADDRESS +  
+ VIRGINIA HANSELMAN 5818 TULANE ST. 92122 +  
+++++

At our April 16th meeting, Tony D'Attilio gave a talk on the Periostracum in Gastropods and other mollusks. It was a generalized presentation marking differences in types of periostraca. Some are very delicate and still the only protection the animal has, some are sculptured, some only translucent films - others are very tough, even horny. Removal of the periostracum may disclose great beauty or subtract the only beauty of the shell.

He illustrated his talk with specimen slides and also had the shells to be examined.

Collectors should have specimens with the periostracum even though a very cleaned shell is a preference - remembering that Clorox should never be used in cleaning if saving of the periostracum is desired. To preserve it one can use equal parts of glycerin and alcohol.





## THE GOLDEN AGE OF SHELLING

Quite often in discussing the collections of earlier times we will hear the expression, "that was the golden age of shelling". The speaker will usually have in mind some period in the eighteenth or nineteenth centuries when so many of the renowned historical collections were assembled. It must have been very exciting to have collected at a time when almost every new area brought forth species that were new to science and even re-working the older and better known localities would often uncover one or more species that had never been described. I have often wondered how many shells were named in the first half of the nineteenth century. Describing and naming this vast number of shells brought into prominence many of those authorities whose works have made them true giants in the biological sciences.

The early years of this century were especially good for shelling on this coast. In those years many shells were found intertidally that are not found today except by diving or dredging. Forreria belcheri (Hinds) was found on mud flats at low tide in protected areas such as Newport Bay and on Terminal Island. San Diego Bay was a veritable paradise for a large number of the shells of this area.. Many of the shells which were found there are seldom found today. Such shells as Anadara multicostata (Sowerby), Laevicardium elatum (Sowerby), Trachycardium quadragenarium (Conrad), Acmaea depicta (Hinds), Lunatia lewisii (Gould), Sinum scopulosum (Conrad), Mitra idae Melville, Pyramidella adamsi Carpenter and many others were found there. Some of the outstanding West Coast collections were assembled before our bays and lagoons were dredged to make small craft harbors. The disruption of their natural habitat has caused some species to become very scarce, at least in the littoral zone. Many of these areas are not accessible to collectors today, even if the shells were still there.

This does not mean that the collections of today are inferior in any way to those of the past. On the contrary, many of today's collections are vastly superior. Because of increased knowledge and improved methods the collection of today is better curated, and since a large number of shells are newly described every year most of our collections contain shells that were not known to earlier collectors. Even a hasty examination of the superb Panamic-Pacific collection of Ben and Ruth Purdy will disclose dozens of species that were named after Carpenter wrote, Catalogue of the Collection of Mazatlan Shells in the British Museum, 1857. All of those shells were completely unknown to Frederick Reigen, on whose collection Carpenter's work was based. Many of the shells in the Purdy Collection were named after the publication of the current edition of Dr. Keen's exemplary work, Sea Shells of Tropical West America. Another outstanding collection is that of Phil Clover. It is very doubtful if there were many collections of the past that contained as large a number of genuine rarities as are to be seen in the Clover Collection.

Improved transportation has enabled us to go shelling in areas the earlier collectors could only dream about. Today we have Directories and other publications listing collectors throughout the world with whom we may exchange shells and information. It is a very easy matter to contact a collector in almost any area we wish. This advantage was not known to most of the earlier collectors. Such exchanges have made it possible for us to get recently described shells from other localit-



ies, which were almost unknown to our predecessors. Surely, we should not overlook the great benefit SCUBA diving has been to us. We all have at least some shells that were collected that way. The earlier collectors had to depend almost entirely on dredging and trawling for off-shore species.

In last Saturday's mail were two Shell Lists, from two different sources. Both of them, however, were from our two good friends and fellow members, Phil Clover and Art and Emma West. By an odd coincidence both of these lists are offering two extremely rare shells, Conus gloriamaris Chemnitz and Pleurotomaria rumphii Schepman. Strangely enough, we have had two other lists offering Conus gloriamaris recently. I very much doubt that any of the earlier collectors were ever offered four different Conus gloriamaris, all within a three-month period. Surely, if Lamarck or Swainson or the Sowerbys could have foreseen our times they would have said, "that will be the golden age of shelling".

--Clifton L. Martin

### A SEASNAKE TALE

Relating to the talk by Dr. James Stewart from Scripps on dangerous marine animals, it brought back an incident that occurred in New Caledonia on our first shell hunting trip to the South Seas in 1968.

We were in Noumea and visited the aquarium of Noumea and were fortunate enough to meet the Curator, Dr. Rene Catala. Dr. Catala is the discoverer of the rare fluorescent corals and the display of these corals under black light at the aquarium is worth the trip if you saw nothing else. These are all from 250' deep or deeper and their beauty is unequalled by anything I have found in the Sea. Dr. Catala, upon learning we were serious collectors and divers took us on a personal tour of the laboratories and "Backstage" in the Aquarium. He has developed a fascinating system of photographing the Corals and fish under black light. The tour ended with an invitation to accompany his diving crew the following day.

We left the following morning about 6 A. M. for an island about 25 miles southwest of Noumea called Amedee Island. It is a beautiful coral atoll (is there any other kind?) with the highest light house in the world (The French captain claimed!). It is indeed a sight to behold, on approaching the Island, to see the huge white tower soaring hundreds of feet into the sky from its lush, green island base.

En route we stopped at a reef to dive on two liberty ship wrecks from WWII which had been run on the reefs by the captains, after being torpedoed, to prevent their sinking. The deck loads of tanks and war materials are clearly visible but dangerous to dive around as they are about to collapse from rust and action of the sea.

We arrived at Amedee and took to the water at once. Surrounding reefs are about 75 yards from the beach and shell hunting was fabulous...Our take for the day was Conus chenui, litteratus, eburneus, Strombus lentignosus, vomer, aurisdianne, mutabilis and labiatus, Terebellusa and Cypraea arabica. We should have found more Cypraea but we cannot bring ourselves to tear up the coral like the natives to find them... but I'm ahead of my story!

I entered the water and headed for the reef when I saw a brightly





banded snake about 3' long swimming directly towards me on the same level. I have never been a snake fancier on land and am not about to become one in the water. I attempted to fin in reverse with little success. The snake passed directly beneath me, less than a foot away, ignoring me completely. In a very few minutes I managed to restore movement to my muscles and swam leisurely to the beach touching the water with my fingertips and fins only.

On the beach I found Emma with her eyes about 2" in diameter. When she became coherent I found two of the snakes had practically run over her. I rounded up the Frenchman in charge, a Paul Goulette and advised him to get the others out of the water. He doubled up laughing and it appeared they had experience with tourists before and we had been initiated. The others enjoyed the show and it made their day. Paul took us to some nearby rocks and it was literally covered with the snakes sunning themselves. Paul picked one up without fear, showed us the mouth and fangs. While they were indeed a poisonous Coral Snake, the mouth was very small and the fangs set far back. They were not aggressive and, he assured us, one could walk or swim freely among them without fear.

We, with considerable doubts, went back to the reefs and, before leaving the Island were swimming within inches of the snakes and ignored them as they did us. Had anyone bet me the morning we started that I would be voluntarily in the same water with snakes, could have obtained some very good odds and that Emma would be there, Well the odds would have been fantastic. What people will do to collect shells is amazing! As a sidelight, later in Australia on the Barrier Reef, the Captain of a boat we were on refused to let me dive on a particularly inviting part of the reef telling me that there were Sea snakes in that area. I assured him I was quite familiar with sea snakes and had no fear of them. I was quite put out when he remained adamant in his refusal. We later saw a short film on the snakes of that area and they were 8 to 10 feet long, 4" in diameter, had VERY large mouths and fangs and would attack a diver (or anything else that moved) on sight. Two divers had died the previous year after being bitten! MORAL - never argue with the natives.

--Art West

### DEADLY OCTOPUS

One day in 1967, a 23-year-old soldier picked up a small purple-colored octopus from a Sydney beach in Australia. 90 minutes later he was dead. The octopus was a deadly blue-ringed octopus (*octopus maculosus*), and many of them are invading South Queensland beaches. According to Ocean Industry Magazine, this octopus may be the "deadliest creature on earth", adding that the creature rarely exceeds 10 cm (3.9 in.) in length, but carries enough toxin to kill 10 men. "The venom causes muscle paralysis and the victim dies because he cannot breathe"

The Medical Journal of Australia reports that these creatures are found from southern Tasmania to northern Australia, and at rest it has dark brown to ochre bands over its body and arms with blue circles on these bands. When disturbed, the colors darken dramatically. The octopus can be found in tide pools, but also hangs out in other places. Triton Magazine reported a case where a diver found a shell and put it inside



her wet suit for safekeeping, whereupon the octopus inside the shell bit her. Luckily she lived. Scientists are trying to find an antidote for the poisonous bite.

--From "Sea Secrets"

UN DICCIONARIO PEQUEÑO PARA CARACOLEROS EN MEJICO OR  
A LITTLE DICTIONARY FOR SHELL COLLECTORS IN MEXICO

<u>ENGLISH</u>	<u>SPANISH</u>	<u>PRONUNCIATION</u>
Abalone	oreja marina or abalón	or-a-hah mah- <u>ree</u> -nah ah-bah- <u>loan</u>
Algae	alga marina	ahl-gah mah- <u>ree</u> -nah
Anemone	anémone de mar or actinia	ah-nay-moh-nay day mar ack- <u>teen</u> -e-yah
Ark shell	pate de mula	pah-tay day moo-lah
Barnacle	barnacla	bar-nah-clah
Beach	playa	piv-yah
Bivalve	bivalvo	be-bahl-boh
Cardium elatum	concha amarilla	cawn-cha ahm-ah- <u>reel</u> -yah
Clam	almeja	ahl-may-hah
Cone	cono	coh-no
Coral	coral	coh- <u>rahl</u>
(colonial coral)	madrépora	mah- <u>dray</u> -pore-ah
Crab	congrejo or jaiba	cawn- <u>gray</u> -ho hai-bah
Dive (to)	buscar	boo-say-ahr
Gorgonian	gorgonia	gore- <u>go</u> -nee-ah
Jellyfish	ortiga de mar or medusa	or- <u>tee</u> -gah day mar may- <u>doo</u> -sah
Limpet	lepada	lay-pah-dah
Mangrove	mangle	mahn-gl原因
Murex (black)	chino negro	chee-no nay-grow
Murex (pink)	china rosa	chee-nah ro-sah
Murex regius	china rosa con boca negra	chee-nah ro-sah con boh-cah nay-grah
Mussel	mejillón	meh-heel- <u>yawn</u>
Octopus	pulpo	pull-poh
Oyster	ostra	awss-trah
Pearl oyster	madreperla	mah- <u>dray</u> -pear-lah
Pen shell	Callo de hache	ky-yo day atch-ay
Scallop	pechina	pay-chee-nah
Seahorse	caballito de mar	cah-bah-yi-to day mahr
Seashell	concha	cawn-chah
Sea urchin	erizo de mar	err-rit-zoh day mar
Shark	tiburón	tee-boor-own
Shell collector	coracolero	car-ah-co- <u>lair</u> -roh
Shellfish (usually to eat)	marisco	mar- <u>iss</u> -coh
Snail	caracol	car-a- <u>coal</u>
Sponge	esponja	ess-pon-hah
Squid	calamar	cahl-a-mar
Starfish	estrella de mar	ess- <u>tray</u> -ya day mar
Strombus galeatus	burro	boor-roh
Strombus gracilior	castillo de chino	cass- <u>tee</u> -yoh day chee-no





Tent olive (Oliva porphyria)	bartita	bar- <u>tee</u> -tah
Tube worm	palmerita	pahl-mare- <u>ee</u> -tah

\*Underline indicates accent.

If you have additions (or corrections) to the Gringo Diccionario, please send your words on in to us.

--Carole M. Hertz

## A TRIP TO THE MARQUESAS ISLANDS

One morning we and another boat, started on a trip to the Marquesas Islands, and we got to Key West at 6:00 in the morning, and soon launched the boats and were off. A man had given Ivan the direction to take to go down between the islands, and most of the way would be protected. Well the first thing we got on a sand bar, and after freeing both the boats, we were in the lead. We decided to go directly to the sea and go along the small islands. This we did. The water was smooth and we went sailing along. It is 30 miles below Key West toward Cuba. The most open water we had was four miles just before we got to the Marquesas Islands. It is quite a way in a small boat. Then the beautiful islands. They are in a semi ring and looked so tropical. We went to find Strombus gigas Linne for some of the people who were going back to Colorado in the next few days. We went slowly along the sides of the island and found only a few. We never did get to the gulf side of these islands, which is something I still want to see to this day. We found only a few S. gigas. Then the tide had turned so we thought we had better get back across that four miles of open sea. We did and then continued back along the islands. It was light and we could see where we were going. Along on the edge of the islands going back we found Strombus raninus Gmelin, Conus spurius atlanticus Clench, one Tonna galea Linne and that was about all but a fine fun day. We arrived back in Key West in no time at all. It is 48 miles from Key West to Marathon where we made our headquarters for some 11 years. So we feel we know place very well along the Keys. Another time I will take you to the Atlantic side of the Keys shelling - to Pelican Shoals.

--Helen Thompson

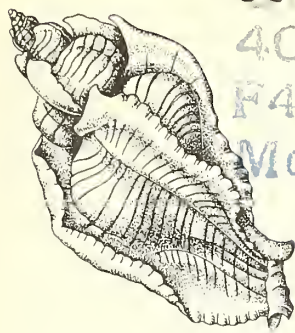
## MINUTES OF APRIL 16 MEETING

Minutes of April meeting were accepted as printed in the Festivus. Treasurer's report showed a balance of \$206.00. The shell drawing was won by Ivan Thompson. The president announced that Ruth Purdy was in Grossmont Hospital. (She is at home now) The Club auction will be held on Fri. May 15 starting at 6:30 p. m. at the home of Waneta and Cliff Ames. The Club discussed Conservation and Barbara Good was appointed to check into the Fish and Game Regulations.



THE

# FESTIVUS



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## SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968

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Vice President: Nola Michel

Recording Secretary: Barbara Myers

Corresponding Secretary: Barbara Good

Treasurer: Margaret Mulliner

Editor: Blanche Brewer

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VOL. I DIVISION OF MOLLUSKS JUNE 1970

NO. 6

+++++  
+ Program for June 18= Dr. Carl Hubbs on Marine Conservation +  
+ Publication Address: +  
+ Virginia Hanselman, 5818 Tulane St., San Diego, Calif. 92122 +  
+++++

### OUR ANNUAL AUCTION

On Friday evening, May 15th, our Club met at the home of Cliff and Waneta Ames, our gracious hosts for the evening. We had a pot-luck dinner, with many luscious goodies. An abundance of delicious food was served. There was wonderful champagne punch, prepared by our punch maker, Dave Mulliner. Needless to say, the punch bowl was a popular place.

After the meal was consumed, and we had all visited for a bit, Dr. Radwin presented a gift to each of his helpers at the museum. These helpers are volunteering their time to help on the museum collection. To his Monday helper, Barbara Good, went a Murex macropterus, variety Trempei, to his Wednesday helper, Eva Taylor, a selection of six color variations of Polymita picta and to his Thursday helper, Carole Hertz, a Cancellaria cooperi. They were all surprised and very pleased. Then the auctioning began. Norm Currin started it off and did his usual excellent job as auctioneer. He was ably spelled later by John Souder and George Radwin. The bidding was spirited and sometimes, as in my case, outrageous. "Gonna have that shell or else...!"

The specimens that were donated this year were all of good quality. The choice of which you wanted was a difficult one to make. When bidding lagged later in the evening, there was a break called. If there was still something on the table that you wanted to bid on, you were to place it in front of the auctioneer. When the bidding resumed, interest again was high, and the pile presented was soon depleted. The shells that were not bid on will most likely be put into grab bags for sale later in the year or saved for our next auction, as we have done in times past. Our sales for the evening totaled a fantastic \$395! It was financially the best auction I can remember in this club. Socially, it was a most pleasant occasion. If you missed it, we hope to see you at next year's auction!

We wish to thank again our hosts, Cliff and Waneta Ames, for opening



their home to us. Their lanai is the best place I know of to have the auction, as it is so pleasant and spacious.

--N. M.

#### ONE-MAN SHOW

On Monday evening, 18th May, at the Natural History Museum, there was an open-house reception for a new display honoring our very active member, Anthony D'Attilio. It is a one-man show in which are displayed the many and varied artistic talents of Tony. Coffee and cookies were served and friends mingled about, admiring, and amazed at the items on display. From pen and ink biological drawings and illustrations for childrens' books and scientific publications to sculpture and etchings on glass, all were excellent and amazing. One thing I found, that unlike most artwork, the closer you look at Tony's, the more you see in it.

The display is a temporary exhibit, very expertly done. You should put a visit to the museum on your calendar soon. This display should not be missed. If you miss the arrogance of a certain smiling camel, you will have missed much indeed!

--N. M.

#### BOOK NEWS

Although the Club library is wonderfully stocked with shell books and magazines, the utilization by club members is minimal. Obviously, many of the more advanced collectors have many of the books in their own libraries. However, with the wide variety available, it seems reasonable to expect more withdrawals than the 3 or 4 per month that the library is presently averaging. In order to familiarize the members with the available books, it has been decided to review some of the older books. If anyone has ideas on new acquisitions, please contact the librarian.

"Living Cowries" by C. M. Burgess has finally been published, and the library has a copy on order. Myra Keen's new book on West American shells is due out shortly and will be ordered as soon as it is available.

This month's review is on an extremely useful book, "Marine Shells of the Pacific", by W. D. Cernohosky. Published in 1967 by Pacific Publications, this book contains several fine chapters on general information in addition to descriptions and plates of 440 shells. Of particular interest is an evolutionary tree which traces the evolution of mollusca from the Tryblidiacea of Pre-Cambrian times to the molluscs of the present age. Other interesting items deal with the removal of radulae and shell photography.

The shells described are limited to the families Bursidae, Cymatiidae, Colubrariidae, Triviidae, Muricidae, Olividae, Terebridae and Conidae. The photographs are black and white and of excellent quality. The shell descriptions are excellent and are often accompanied by description of the animals. Mr. Cernohorsky lists the synonymy for each of the species described, and based on this he would be considered a "lumper" rather than a "splitter". This is a 'must' book for those who have collected in the Pacific.

--Jules Hertz

## AQUARIUM OBSERVATIONS

From time to time we hope to be able to print observations by our members and friends who have aquaria or who dive and take the time to "see" as well as "sieve". Please send us details of any interesting occurrences you may have noted. They need not be long. We'll group them and have a newsworthy column.

In our small aquarium, the Cypraea spadicea relentlessly pursued an anemone round the tank nibbling at its adhering end whenever possible. I'd never seen an anemone "swim" before. After a number of days the cowry killed and completely ate the anemone. This same Cypraea has been seen eating Laevicardium substriatum and also dead matter in the tank.

--Carole M. Hertz

I have kept some several octopuses in aquaria over the past couple of years and for the most part they stay out of sight, hidden in a shell or behind the filter, etc. and only come out at night. However, if you are really interested and observant, you begin to put together a personality and an intelligence.

The octopus I now have lives with an Opaleye some five inches long. The octopus, stretched out, is just about six inches from arm tip to arm tip. The fish thinks he is the absolute ruler of the aquarium and makes all the motions of any bully -- swimming powerfully back and forth, nipping at the cowries so that they withdraw their mantles and at the other shells so they close their opercs.

I do not say the octopus is not frightened of the fish. He simply outwits him. When he is tired of the threatening tactics of the Opaleye, he just piles a bunch of shells at the opening of his house and relaxes. If he really wants something (say I have just put in a crab) the fish doesn't stop him from getting it. He slithers out of his home changing colors like mad, flicking an arm at the fish and -- if all that isn't enough for the poor fish -- the octopus inks and is gone. I put a crab in one day and the octopus had so many shells piled in the opening of his house that he couldn't get in with the crab. As I watched, he held the crab in four arms and with the other four was throwing shells hither and yon and changing colors with amazing speed. Then there is the story of the cowry -- the up and down norrissia -- but I'll save these for another time.

--Barbara Myers

A Cassis centraquadrata was collected south of San Felipe at Radar Beach, Baja Calif. Mexico. We brought the Cassis back to San Diego and placed it in our aquarium. The feeding habits of the Cassis are interesting. It eats sea urchins.

The Cassis normally lives under the sand but when he is hungry he will surface and start tracking any sea urchin in the tank. If an urchin is captured out in the open, the cassis will sit on his spire, cuddle the urchin in his foot and eat all of the insides. Then the cassis will eat all the spines.

The other day the Cassis captured an urchin in the corner of the tank. The Cassis drilled a hole in the side of the urchin shell and ate only part of the animal. Possibly it wasn't very hungry. Nevertheless, it still ate part of the spines.

--Dave Mulliner



## NOTES ON THE SUPERFAMILY PLEUROTOMARIACEA

In oceanography class I learned a handy little saying to remember the order of things. It goes "K. P. Comes Often For Girl Scouts". It sticks with me as I was a Girl Scout for years, and helps me remember that all things fall into this order. KPCUFGS. Kingdom, Phylum, Class, Order, Family, Genus and Species. With that in mind I will try to place in your mind where the superfamily Pleurotomariacea falls, and how the families it contains are related.

Kingdom -- Animal. Phylum -- Mollusca. Class -- Gastropoda. The word is taken from the Greek, meaning stomach-foot. Term for univalve mollusks with the stomach situated in the region of the foot. The shell is in one piece, spirally coiled, and asymmetrical (not symmetrical). All gastropoda undergo a strange twisting change in the embryonic stage, so that many of the posterior internal organs along with the mantle cavity end up in a forward position. Sort of like throwing your tail end up over your left shoulder, as I once heard it described. This is called "torsion". There are varied degrees of torsion, and some even detort in their growing process. The Subclass Prosobranchia is the branch of this class that we are going into. They have their gills in their mantle cavity.

Of the three orders in this subclass, we will be concerned with the Order Archeagastropoda. Archaeo- is taken from the Greek, meaning ancient. The most primitive type of gastropoda living, they are all herbivorous, which means that they eat plants. They have many teeth on their radula to help them do so more efficiently.

Now we arrive at the Superfamily Pleurotomariacea. The Families within this superfamily are Pleurotomariidae, Haliotidae, Scissurellidae and Fissurellidae. The Pleurotomariidae are the beautiful split-top shells that look like the trochid top shells, except that they have a slit opened part way around the body whorl. They have a too-small-for-the-aperture, very thin operc. These animals come from very deep water, so they are very rare in private collections. Don't feel too bad if you don't have one!

Most of us are familiar with the family Haliotidae, the abalone. It is usually a large dish-like shell, with four or more open natural holes on its side. The inside is always beautifully iridescent. I might add that the meat of the foot is also delicious when properly prepared. The animal has no operc.

The Scissurellidae are very small shells, usually coming from very deep water. They are somewhat like the genus Tegula, and are white or semitransparent, and nacreous within. The body whorl is large with a somewhat wide aperture, the outer margin of which has a slit or fissure, or sometimes holes. There is a slit-band on each whorl. The operc is very thin.

The Fissurellidae are a conical to sometimes almost flat shell with a "keyhole" on tops. The keyhole starts as a slit on the front edge of the shell, and as the shell grows the hole arrives at the top. In some genus the slit remains a slit even in the adult.

How are the large beautiful slit-top shells related to the flat dish-like Abalone? And the Keyhole limpet and the small Scissurella, why are they here? It seems that by looking at the shape of the shells that they are so different. Yet, they are so closely related. They are alike in the fact that they have the slits and holes. These are all due to the same reason. The animals are all built on the same body plan, so to speak. The animals in this superfamily are the only gas-

tropods that have two gills. All other families in this subclass have only one gill. Their bodies have such a degree of torsion that their tail-ends are up over their heads. In order to respire, water travels in a circle in their mantle cavity, entering in front and passing over the gill and out again in front, with the exiting water also carrying body wastes. In this state of torsion the original pair of gills (on ancient animals) lay very close to the mantle, and was not used -- so, through time, has atrophied until there remains only one. Yes, in Pleurotomariacea the slits and holes are all for the same function. The respiratory water passes from the front or sides of the shell and over the gills. Then the deoxygenated water and waste materials pass out the holes or slit. This is the way in which these animals have solved their sanitation problems. If the water was to return to the front to exit, considerable pollution of water for respiration would result.

--Nola Michel

Sources: Seashells of America, Abbott-Veliger, Glossary of 1101 Terms-Tony Russo, Oceanography Instructor, Dr. George Radwin, S. D. Museum of Natural History.

QUESTION: My friend said that a squid and a cuttlefish are the same thing. I believe that a cuttlefish has a cuttlebone, while a squid has no bone structure at all. Who is right?

ANSWER: Neither of you is right. Squid belong to the cephalopod order Teuthoidea and do possess an internal shell. This shell or gladius, however, is paper thin and made of chitin.

Cuttlefish belong to the order Sepioidea, specifically to the family Sepiidae, found only in the Old World. They possess a thick calcium carbonate shell which aids in bouyancy control.

Unfortunately, these names have been confused so often that even many dictionaries are in error concerning the use of these terms.

--Sea Secrets

#### NEW MEMBERS

Laurence Thomas Family  
Laurence, Louise and son, David  
The Shell Shop, 590 Embarcadero  
Morro Bay, Calif. 93442  
Joe Bibbey  
490 Citrus Ave.  
Imperial Beach, Calif.  
423-5133

Leo G. Hertlein  
Calif. Academy of Science  
Golden State Park  
San Francisco, Calif. 94118  
Change of Address:  
Helmut and Ruth Meier  
1010 Pinecrest Ave.  
Escondido, Calif.  
747-5339





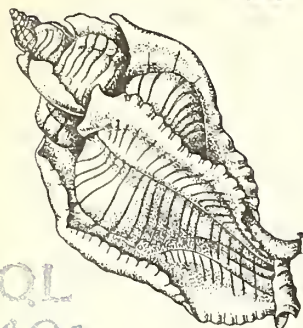
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## SAN DIEGO SHELL CLUB

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Museum of Natural History - Third Thursday - 7:30 P.M.

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Recording Secretary: Barbara Myers  
Corresponding Secretary: Barbara Good  
Treasurer: Margaret Mulliner  
Editor: Blanche Brewer

Vol. I

July 1970

No. 7

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\* Next Regular Meeting -- July 16, 1970 at 7:30 P.M. \*  
\* \* \* \* \*  
\* Dr. David W. Kenney, Vice President & Veterinarian of Sea World \*  
\* speaks on "Marine Mammals, Their Capture, Care and Training." \*  
\* \* \* \* \*  
\* Publication Address: \*  
\* Virginia Hanselman, 5818 Tulane St., San Diego, Calif. 92122 \*  
\*\*\*\*\*

### MARINE CONSERVATION

The speaker at our June meeting was Dr. Carl Hubbs from Scripps Institution of Oceanography, his subject, "Marine Conservation" - in particular, in the seas of the world - The World Ocean.

Pollution comes from many sources with the air currents carrying pollutants, even thousands of miles, to drop them in dust and rain on the surface of the seas and the land. The land itself drains its poison into the rivers - and so, the sea receives it all eventually as an ever - growing menace to its inhabitants.

Most people are aware of the sources - industrial wastes, automobiles, planes, pesticides, sewage - but not which poisons cause the damage. Lead is ten times the most serious, coming mostly from fuels - industrial poisons, acids and mercury, very toxic in their effect - sewage, raw or only partly treated - pesticides, which stay in the fatty tissues and in each exchange in the food chain are multiplied by ten.

The California Brown Pelican is almost extinct, DDT having damaged the reproductive process. Eggs that are laid have shells so thin they can not protect and support life. Consequently, the count is decreasing extremely rapidly. A year ago there were 800 birds on the Coronado



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Islands. This year, there were only 9 nests and only one doomed egg was observed. The accumulated DDT keeps their bodies from producing the necessary calcium. In Newport Bay, abalone shells are so thin they may be broken by a finger thrust, Dr. Hubbs tells us.

As long ago as 1920, Dr. Hubbs observed the effect of sewage in San Francisco Bay on the fish. A very high percentage had cancerous spots and growths. In the early forties, San Diego Bay was receiving sewage, the highly-nutrient condition of the water caused the formation of a great mass of chocolate-colored algae and a matching increase in the fish population. Dr. Hubbs, examining many individuals, found them to be malformed, having S-shaped vertebrae.

Still, there is promise of better days ahead. Everywhere, an alarmed population is taking steps to combat pollution. The effluent is being treated before discharging it in the water. A process known as reverse osmosis is being explored - the sewage flowing into a membrane through which only the water molecules can pass. A membrane successful enough to handle the sewage of a large city is the desired result.

As to the water itself: A chain of sewage treatment lakes at Santee produces potable water. Steam electrical plants can return the warm water resulting from their cooling processes to the sea, pumping it to bottom levels offshore. The rising warm water causes a beneficial mixing. Aquaculture of selected species is possible. Warmer water, in some cases, assures a higher rate of production.

Stefan's waste - from sugar factories - is a rich source of vitamin B12. Solid wastes subjected to 1000° of heat in a completely closed structure become coke. Recycling of solid wastes will be the answer to the garbage disposal problem. Paper and steel are old stories, as are vegetable fibers, cotton and linen, but to these have been added aluminum, glass and solid plastics. (What remains can be safely left to the naturally - inventive American mind). ---B.B.

## FOOD FOR THOUGHT

By Dr. George E. Radwin

While savoring your next abalone steak, or other marine gastronomic delight - lobster, crab, clam, shrimp - ponder for a moment what the eaten eats. The food and feeding habits of the commoner marine invertebrates, edible and otherwise, are as varied as the feeders themselves. A few examples follow.

The abalone, known better for what it can do for our appetites than for how it satisfies its own, is a browser, whose manner of feeding might be compared to that of a cow. To complete the analogy, imagine the abalone using its radula to browse or crop algae. The radula is a flexible rasp found in gastropods (snails) and some other mollusks, taking various forms in different animals. It is a tooth-bearing cartilaginous ribbon, bent double over a stiff cartilaginous rod. The radula works back and forth in a belt-like fingernail material) and silica (like glass or sand particles). According to the food habits of the animal, the radula is effective at rasping, raking, or boring.





The abalone's long, slender radular teeth cut the algae up and rake the fragments into the mouth of the animal. How this relatively unpalatable algae is converted into the tasty meat familiar to us is a mystery not yet unraveled.

Another gastropod delicacy, although not generally tasted on this coast, is the whelk (one of a number of species in the gastropod family Buccinidae). The commonest whelk in this area is Kellet's whelk (*Kelletia kelletii*). I have never tasted the meat of this species, but judging from other members of the family (some of which I have eaten), the foot, at least, is tasty but tough. Whelks are eaten in many seacoast regions of Europe, particularly in England.

The whelk has a narrow radula, composed of many transverse rows, each with only three teeth. The sickle-like shape of the lateral (side) teeth is well adapted to flesh-tearing. The animal's diet includes living and dead flesh.

The succulent clam, a bivalve, is certainly one of the seafood lover's favorites. Unlike the gastropod, the clam leads a more sedentary life - living in a relatively restricted area, moving around little, if at all. How, then does it feed? "If Mohammed cannot come to the mountain--." The clam draws a constant stream of water over its gills. This current, caused by the beating of millions of microscopic hair-like structures called cilia, not only brings oxygen to the gills and removes carbon dioxide, but also carries food, which is caught in mucus tracts on the gills and transferred to the mouth.

The sea urchin, rarely used for food in the United States, is frequently eaten in other parts of the world, such as Italy. Actually, only the gonads (reproductive organs) are usually eaten. I have tasted the gonads of a Floridian species, and I confess that the acrid, almost sour taste did nothing for me except to give me an enormous thirst - for anything.

The urchin grazes on algae using its feeding organ, a remarkable apparatus known as "Aristotle's lantern". This structure is actually made up of numerous parts. The calcareous plates, ligaments, and muscles function efficiently to operate four calcareous "teeth", which protrude from the oral surface. Often sea urchins are found imbedded in cavities in the rock - cavities eroded by their feeding activity. Where the urchins live on kelp holdfasts, the feeding of the animals eventually produces gaping holes and inevitably, the uprooting and death of the kelp plant.

Another animal rarely, if ever used as food in the United States is the polychaete (bristle) worm *Glycera*. In Polynesia, however, other polychaete worms, called "Palolo" by the natives, are collected in vast numbers when at certain times of the year they swarm at the surface of the sea. Actually, the swarms of "worms" are made up of the hind ends of worms, the other part of each worm remaining in rock-encrusting tubes at the bottom. The swarming of these reproductive portions of the worms occurs only on one or two nights of the year and assures high success in the meeting of the eggs and sperm contained in these fragments. Apparently, the average Polynesian's contention that these Palolo are delectable treats is well-nigh unshakeable.



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Glycera, a local relative of this exotic spawner, is found on mud or sand bottoms roaming freely across the sea bed, rather than restricted to a tube as the Palolo worm is. The feeding mechanism of this worm consists of four hooks borne on the end of an eversible proboscis. When attacking, Glycera contracts its body-wall muscles, forcing fluid into the proboscis and causing it to be everted or thrust out with astonishing speed and force. The four hooks are thereby positioned at the tip of the everted proboscis and are capable of grasping, with a pincer-like action, the small worms that make up the bulk of the worm's diet.

Several crabs, ranging from our east coast blue-claw to the large dungeness and the bizarre king crab of the Pacific, are widely eaten, especially since the advent of frozen foods.

Crabs are usually carnivores and feed on almost any meat, living or dead, that they can find. Their large, impressively armed chelae or claws tear food into pieces small enough to be passed into their mouth. Surrounding the mouth are various types of mouthparts, the most important of which are generally the mandibles, paired lateral jaws which "work" from side to side grinding the pieces of food passed into the mouth by the chelae. Other mouthparts are also used in one feeding capacity or another.

Gastropods of the family Muricidae, the Murex or rock shells, are eaten in several European countries, most notably Italy. By all accounts the meat is sweet, though tough.

How do these gastropods feed, and on what? Here we have another example of the versatility of the gastropod radula. In the Muricidae there are three teeth in each transverse radular row. These are somewhat differently shaped than those in the Buccinidae, and, more significantly, the average number of transverse rows of teeth is higher than generally prevalent in the Buccinidae. The muricid radula is adapted for rasping and boring holes through shell matter such as clam or barnacle shells. It does not, however, function alone in this process. An additional organ, the ABO (accessory boring organ) is applied alternately with the radula. The exact nature of the secretion of the ABO is unknown, but it is reasonable to assume that it weakens the calcium carbonate in some manner and thus allows the radula to erode the shell more efficiently.

The common seastar does not appear on a dinner menu in any known region. Nevertheless, it continues eating its fill of other seashore residents, as though its right to do so bore no connection to our own eating interests. But then, he was there first; we are, after all, the "johnnies-come-lately" on the seashore scene.

The feeding of the seastar, *Pisaster ochraceus*, is more voracious than that of other denizens of the shore. As with most seastars, this species is equipped with sucker-tipped tube-feet in tracts along the underside of each arm. When the seastar becomes aware of prey in the immediate area, generally by "smell" (chemoreception), it "speeds" to the prey, usually a clam, grips the two valves (shells) of the clam and exerts proportionately great pressure in two opposite directions so as to pull the valves apart. The adductor muscles, which holds the clam's valves together, is quite strong, but its staying power is





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no match for the seastar's tube-foot suckers which work on a water pressure principle. Applied in relays, these suckers eventually exhaust the adductor muscle causing the valves to gape. The seastar then everts its stomach through its oral opening, insinuates it between the clam's gaping valves, and proceeds to digest the animal externally. Talk about bolting one's dinner!

When all is said and done, as remarkable as it may seem to us, all these animals seem to consider their feeding far more important than ours.

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## BOOK NEWS

Jules Hertz

"The Living Cowries" by C.M. Burgess has finally arrived. One quick glance at this excellent book is enough to know why it took so long in coming, and it was well worth the long wait. The book is copiously illustrated in both monochrome and color. It contains 44 color plates of very high quality showing the 186 species recognized by Burgess as well as geographical race variations of many of them. In addition, there are 184 maps which show the distributional ranges for the individual species. Our fellow Club member, Tony D'Atillio, also contributed some fine schematic drawings showing the conchological characters of a cowrie.

Burgess follows Kay in this book and reverts to the use of the Linnean genus *Cypraea*. For the average collector this is certainly better than Schilder's (1941) proposed division of the family Cypraeidae into four subfamilies, 11 tribes, 22 sections, 46 genera, 72 subgenera, 405 species (including the fossils), and 503 subspecies or races. Anatomical studies by Kay have shown that the taxonomic groupings of the cowries into subfamilies, genera and subgenera by Schilder, Cotton and Steadman, Allen, and others, are not supported by anatomical differences. Further anatomical studies may significantly reduce the number of species recognized by Burgess in this book. Burgess has arranged the plates so that similar species are pictured together or in succeeding plates for comparison purposes.

This book has several features which will appeal to the average collector. These include a system of rating the shells as to rarity, detailed descriptions of the animals where such information exists, and habitat information.

The book is excellent from almost every standpoint and it would be difficult to find anything to criticize. Published jointly by A.S. Barnes & Company and Carlton Beal, the book sells at thirty dollars a copy. Members can obtain the book from Seashell Treasures in Chula Vista, since Art West has stocked a large supply.



## CYPRAEA - GENERAL INFORMATION

By John Souder

The Cowries (Cypraeidae) from a family recognizable at a glance - the shells being colorful, polished, more or less ovoid, rounded on the back but flatter below. The base is crossed by an aperture extending length ways and bordered by ridges or teeth, usually numerous.

The spire of the shell is reduced or entirely absent when adult. There is no operculum (or "lid") closing the entrance of the shell as is the case in most families in the order to which the cowry family belongs. The mantle, or part of the body which lays down the shell, has two large side flaps which meet over the back of the shell when the animal is in motion, thus resulting in the high polish so characteristic of this family.

A collecting trip to an area inhabited by Cypraea will usually result in finding a number of species. At first sight, it seems surprising that these species flourish in one environment. It may seem biologically uneconomical for so many to have evolved in order to fill one niche. A little further study, however, will show that there are differences in the areas inhabited by the various species. Some are more tolerant to exposure to air than others, and are found further up the beach.

Some will be found concealed under stones or coral, while others will be in more exposed places. Time of collecting will also cause certain species to be in the open when normal conditions might find them elsewhere. For some species the area will obviously be more suitable, and the population will be large. For others, it will be the edge of an inhabitable area, and fewer animals will be found.

As well as these smaller differences of habitat, there are some larger ones which will be readily apparent. Some species are only found on the outer edge of coral reefs - (aurantium, testudinaria) - others, usually in deep water (saulae, mappa), some on sand or mud, or under isolated stones or pieces of dead coral among sand or mud. Some live in, or on Bryozoa in deeper water, while others are only known from chance discovery by dredging or from the inside of fishes.

If we could define the precise habitat of each species in each different part of its range, we would have a far better idea of the significance and of the origin of the groups now called sub-species. We would understand the reason for their differences, and so would have a better understanding of the means by which the diverse forms, now contained in the family Cypraeidae, have evolved from a single remote ancestral group very far in the past.

To achieve this knowledge, precise information is needed for collectors on the local habitats of species. 1 - Precise locality, 2 - Date, time of day, state of the tide, 3 - List of species in the locality, 4 - Lengths of all shells collected, 5 - Habitat of each species, i.e., 5 specimens under dead coral, 3 under stones. 6 - approximate number of live specimens seen of each species, 7 - Depth, or position of each species in the intertidal zone.





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In the latter case, the best way is to make a rough sketch of the beach, showing high and low tide levels, and indicating the heights between. Either plot on it, the area in which each specie was found, or indicate where each specie was plentiful, rare or absent. Egg-masses - were they found? What species were on them?

## HUNTING CYPRAEA ON THE FLORIDA KEYS

The cypraea is one shell that is easier to find at night. So most trips were made from 9:00 P.M. on into the morning. We would take two motors - one large and one small - to use after we got to the shelling places. We would go to the Tom's Harbor landing, put the boat in, then go all around the little islands, using lights from a battery. With long poles and the small motor, Ivan would back the motor along and I would keep the boat in close to the rocks. We had a long pole with a small net on it and when we would spy a cypraea, would use that to dip them up with. We found all the real large cypraea cervus we have at this place. Also we found the cypraea zebra (Linne) at the same time. It was always the darkest night, and around 12:00 or 1:00 in the morning when we could find them. We had a pot we had bought in Mexico, with a lid, that we used to keep them in. They would crawl all over the boat and leave it real slimy if we did not keep them in the pot. Sometimes the tide would be running so strong we could hardly keep the boat close to the shore. When we took another couple, it was so much easier - one to run the motor, one to keep the front of the boat in close, and one to keep the lid on the pot - so they did not get away - and one to dip them from the water. One night we were coming in, real late, maybe close to 3:00 - dark as could be - and Ivan ran onto a sand bar - and we had to get out and pull it off into deeper water. But the water was always warm, so was such fun. On our way in, along the bank, the fishermen turned on their lights. They did not want us to come too close and get tangled in their lines. It looked like a small city when they heard us coming, and turned lights on along the bridges. It was a challenge to find the right opening to get to the car. At night they all look the same, so we had to be careful and, believe it or not, only missed the opening maybe every third time we went out to shell. We went about 15 miles from our trailer park to get to this shelling place. There are places to launch your boat all along the Florida Keys, and most of them are free launchings. We loved it so well we went to Florida from 1956 until 1967 every year, for the winter.

Helen Thompson

## AQUARIUM OBSERVATIONS

### POLYPUS BIMACULATUS - "PUSS"

By Barbara Good

"Puss" is a small - very opinionated - Polypus bimaculatus (octopus), with a personality which required more individual recognition, so now identified for this writing as "Puss".



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Puss's principle residence is the Pacific Ocean, but he (she?) temporarily resides in my salt water aquarium. In it is a large Murex princeps, which serves as a temporary abode. Puss is quite content, so far as one can tell, except when the urge to hunt or eat besets him. Either - or maybe both - causes him to leave the Murex Princeps and stalk the entire aquarium for prey.

Hermit crabs are his easiest targets. He literally 'gobbles' them, no matter how many are placed in the tank. When the hermits are exhausted he attacks anything alive that doesn't move too fast. Limpets are easy prey for him. A small clam that he has attacked several times continues to defy him. The clam apparently is not subject to avoid 'Puss' but recently has hidden in the sand to avoid the constant involvement. (My research on the remains as I clean the aquarium indicates that Polypus bimaculatus do actually drill a shell to withdraw the food therefrom.)

As already indicated, Puss has his way! Recently my son provided fresh abalone for the household. Naturally, I wanted to share with 'Puss'. When I pushed it into the hole left by the loss of the operculum in the Murex princeps he not only refused the delicacy but purposely removed it from his immediate surroundings. He moved it as far away from his abode as space would allow.

Later, I was watching him as he roamed the tank looking for some action. As all the hermit crabs were eliminated and the limpets were in scarce supply, I offered him my finger. It was something new, and apparently he did not like it. I followed him probing and pushing. Indignant at this treatment, he proceeded to crawl out of the tank, over the floor looking for his true home - the Pacific Ocean. Again my son came to the rescue--recovered him and returned 'Puss' to the aquarium. We then installed a cover, which allegedly will retain 'Puss' in his present quarters.

My observation of 'Puss' indicates there are many mollusks that Polypus bimaculatus will not attack. There are several Cypraea spadicea as well as Mitra idae which 'Puss' carefully avoids. He did attack a small Ceratastoma nuttalli which I rescued. In checking back, I determined he had not had any hermit crabs or limpets for over a week. Obviously, it was hunger - not just the hunting instinct at work.

As much time and difficulties that I am having with 'Puss', my family and I now recognize him as he would desire - as an individual of a species.

#### MINI MINUTES

Treasurer's report - \$362.00. New book 'The Living Cowry' for sale to members at 20% discount from Art West. Regular price \$30.00 - discount - \$24.00. Waneta Ames won shell drawing. Membership voted to continue paper - most agreed to contribute articles.





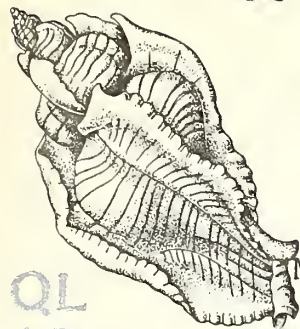
THE

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## SAN DIEGO SHELL CLUB

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Museum of Natural History - Third Thursday - 7:30 P.M.

President: Carole Hertz  
Vice President: Nola Michel  
Recording Secretary: Barbara Myers  
Corresponding Secretary: Barbara Good  
Treasurer: Margaret Mulliner  
Editor: Blanche Brewer

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Vol. I

August 1970

No. 3

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\* Next Regular Meeting -- August 20, 7:30 P.M. \*  
\* \* \* \* \*  
\* Twila Bratcher - Terebridae \*  
\* \* \* \* \*  
\* Dave Mulliner Slides of WSM Meeting and Shell Auction \*  
\* \* \* \* \*  
\* Publication Address: \*  
\* Virginia Hanselman, 5818 Tulane St., San Diego, Calif. 92122 \*  
\*\*\*\*\*

### MARINE MAMMALS

#### THEIR CAPTURE, CARE AND TRAINING

Dr. David W. Kenney, our speaker July 16, has a very special job in a very special place. He is vice president and veterinarian of Sea World. There just aren't very many like places, though their number is increasing.

He mentioned briefly a few of the whale species - the largest of all, the blue whale, a museum model 80 feet long, pictured. They average 2 tons of weight to each foot of length. The largest ever captured was 120 feet long. Let's see, that's 240 tons - times 2000 - 480,000 pounds! A Baleen whale - as big as 2,400 200-pound people!

The California gray whale is also a Baleen whale. With the Baleen, he utilizes the plankton but, swimming with his mouth open, he also gathers in many larger creatures, - as do all Baleens.

The killer whale, blue-black with sharply-defined white side-marking and white belly, is a toothed whale (a dolphin) with canine teeth interdigitally spaced. An adult killer whale is 26 to 28 feet long. The false killer whale is black, much more vicious than the killer whale and averages 14 to 18 feet in length. (Why is he false one?)



The Beluga whale of the Arctic Seas, 10 to 20 feet long, is a Dolphin. Born dark gray or almost black, he becomes white, as an adult and is known as the "white whale".

Whales, being air breathers, usually have their noses (blow-holes) on top of their heads, though there are a few exceptions where the nose is on the front of the snout. A nose detail, on a slide, showed the division of true nostrils.

Sea World is interested in the capture of whales, seals, elephant seals, dolphins. Capture is a fascinating sequence of maneuvers. Contraptions vary from simple nets and squares of plywood to vast nets and cradles. Big boats and fair-sized ships, helicopters are hunters.

Dolphins, they catch (after they have tranquilized them) with a net on a long pole. Attached to the trailing net is a hundred pound barrel. After the dolphin has pulled the barrel until he admits defeat, he is swung aboard and placed in a canvas cradle where he is kept wet, to keep his tender skin from cracking.

They obtained fresh water dolphins in Venezuela. With almost blind eyes, they seem to swim by sonar. They are very small as compared with salt water species. The Pacific dolphins are bigger and hardier than those from the Atlantic.

Elephant seals are herded from the beach to a "cattle chute" which has a securing net. His skin is not delicate and always bears the tooth marks of other (elephant) seals. Since fighting is a part of the male's heritage, through the melleniums they have developed a genetic callous on their necks. They make tremendous growth. An individual weighing 1000 pounds in February now (July) weighs 8000 pounds.

The killer whale they capture in the waters of Puget Sound. Nets a mile long and 200 feet deep are placed in a wide, double, almost - closed circle. A phone call alerts the stationed boats and a helicopter guides the whale "cowboys" in the boats as they "herd" the whales into the "corral" of nets. The nets are pulled around the whales until they too can be swung aboard, as were the dolphins, to much larger cradles. The first whale they got cost them \$250,000. Now, the cost is \$20,000 - so much have they learned.

When the captured animals reach Sea World they are placed in shallow water and "walked" by their trainers so they learn the limits of their new environment. They are guided to the walls and learn about them. When they have learned, the water depth is increased and they adapt.

Every effort is made to achieve the well being of these creatures of the sea. A fine laboratory is maintained and four graduate nurses are on the staff. Inoculations are necessary but these patients can not just be jabbed with a needle. To find a vein to carry a serum, dye was given in food and an x-ray made of a fore-flipper. The picture of the five-fingered hand and wrist disclosed the largest vein for injection.

Some animals are rescued from the beach. They are isolated and cared for. Most of the beach-stranded animals are too-far-gone to save, but some of them do make it and become happy inhabitants of Sea World.





An animal can be trained if it will eat (and the best is what they get). Trainers are responsible for the health and progress of their charges. The trainer uses a whistle. The whistle's sound means that food will be given, so the animal tries to do something to cause the whistle to be blown. Only the one with the whistle will feed him and gradually, they learn - sometimes, even quickly - the routines.

Most of the questions concerned dolphins. A porpoise is a dolphin with spade-shaped teeth and a blunt nose. A dolphin has conical teeth and a beaky nose. Really, they are all dolphins, when toothed.

Dr. Kenny tells us that in Japan they are building four-five-huge factory ships to sweep the seas for dolphins for food. They are already a staple of diet for the Japanese. The terrible threat is that there is not a single existing law anywhere to protect the dolphins from extinction. With such methods used in their capture, extinction could be a reality in as short a period as five years. He urges us to write to our state legislators, our congressmen, to the Bureaus of Fisheries, to State Fish and Game people - anybody, who is interested in getting laws and treaties to protect "Flipper".

(We have a favorable climate, at the moment, for urging conservation - saving of a species. Let's, each of us, do our part, Ed.) (Read "Toward A Livable Environment", Reader's Digest, for August, '70. Names and places, titles of bureaus, are given)...B.B.

## BOOK NEWS

Jules Hertz

An exchange arrangement has been set up with the Santa Barbara Malacological Society, whereby we will be sending them all issues of the Festivus and receiving in return all issues of the Tabulata. The library has been fortunate in receiving many issues of the Tabulata in the past as gifts from members. The Tabulata is issued quarterly and has had many interesting articles and pictures in the past. In its most recent issue, a color photograph was featured. We look forward to receipt of the Tabulata on a regular basis.

At the July meeting, the membership voted to set aside money for the library to purchase the newly announced book, "Living Volutes." This book is scheduled for publication at the end of the year. Written by Clifton S. Weaver and John E. duPont, the book will contain 79 color plates illustrating over 200 species, and subspecies of volutes. It will also feature a dozen plates showing the living animals in their natural habitats.

## VISITING THE 1970 WEST COAST SHELL SHOW AND AUCTION

Carole M. Hertz

Jules and I spent the weekend of July 11-12 in Santa Barbara and during our stay we visited the Santa Barbara Malacological Society's Shell Show and Auction--several times.



It was a most enjoyable show with many fine exhibits and we spent hours pouring over the wonders displayed there. In one large room were housed the many categories of shell exhibits, aquaria, and photography. Around the perimeter of the room were sales tables with everything from cocktail napkins with shell motifs to shells for sale, books, shell pictures and shell jewelry (most beautifully done by our own Donna Snell).

In a separate room were the shells displayed for the auction on Saturday afternoon. Conus gloriamaris, Cypraea aurantium and Murex argus were among the choice items shown. Most of these valuable shells were tagged with minimum bids. We observed one of the top sales of the day when Murex argus (yellow form) was sold for \$250. - its minimum bid.

We found the exhibits of most interest. I think Jules and I felt that Le Roy Poorman's "The Study of Nuclei and Growth Series" one of the most fascinating. Imagine seeing a minute Xenophora, no larger than a grain of sand and in the accompanying photograph, realizing that this tiny animal had already attached its first equally minute pebble!

Mary Ricaud's exhibit entitled "Mexican Sea Treasures" was an encyclopedic display of shells of the West Coast of the Americas. Her collection included not only rare specimens but also exceptionally fine specimens of the many shells displayed in her three cases.

I was intrigued also with Faye Howard's exhibit, "How Are Shells Born?" It was a small display showing a Cantharus macrospira with egg cases under a strong glass. The viewer was able to see the tiny shells (usually three to a capsule) about to erupt from the egg capsules fastened to the adult shell.

Trophies were awarded to the following:

Best Live Exhibit to Stephen Newswanger of Santa Barbara for his exceptional aquarium.

Best Shell of the Show to Laurence Thomas of Morro Bay for the most magnificent Pleurotomaria rumphii.

Best West Coast/Local Exhibit to Mary Ricaud for her previously mentioned display.

Best Exhibit of the Show to Le Roy Poorman for his previously mentioned exhibit.

Best Exhibit of Shell Photography to Richard Walty of Santa Barbara for a slide of Flabellinopsis iodinea.

Best Exhibit by a Junior Member to Steve Walters of Lompoc, Calif. for his display of World Wide Cowries.

Many other exhibits won ribbons in other categories and were most interesting.

We were completely captivated by the Santa Barbara Shell Show and returned to San Diego eager to work on one of our own.





## SOME UNUSUAL EXCHANGES

by Clifton L. Martin

Trading shells of this area for those from other areas is perhaps the greatest factor involved in the growth of most collections. It may be of interest to know that trading shells is by no means a recent development on this coast. In his publication, *California Abalones, Family Haliotidae*, Keith W. Cox relates that there was a flourishing abalone fishery on the California coast perhaps as far back as 7,400 years ago. Further, quoting Brand, 1938, he states, "abalone shells, fragments and artifacts have been recovered from prehistoric grave ruins in Utah, Arizona, New Mexico, Texas and southwest Colorado and are in the remains of all cultures from the Basket Makers to the Pueblo Cliff Dwellers. Abalone ornaments found in Basket Maker graves are an estimated 1,500 years old." He further states that the shells carried eastward on the northern trade route were mostly abalone shells and according to Ives, 1961, have been recovered in numerous sites east of the Mississippi. Since barter was the generally accepted system of exchange used by the American Indians it would be interesting to know just what was received in return for those shells.

It is only when the collector exchanges other things, which have a commercial value, that the true spirit of a shell collector stands forth in all it's glory. Only another collector could possibly understand why some of the more spectacular trades were made and I am afraid the outsider would label us all as being a bit strange. Such advertisements as the following, which appeared in a hobbyist's magazine a few years ago seem almost normal when compared to other trades that have been made. The advertisement stated; PIGEONS. Will swap pigeons for Florida sea shells.

Most of us know about the trade Phil Clover made in which he exchanged an automobile for a Cypraea teramachii Kuroda. At the time the trade was made there were less than twenty known specimens of Cypraea teramachii in the world. Incidentally, one of them, according to Phil's article in the *Hawaiian Shell News* for October 1962, was in the collection of Anthony D'Attilio. Cypraea teramachii is still an extremely rare species and, due to the different type of trawls now being used, may never become more plentiful. It is a very rare occasion when a new specimen is found.

In the summer of 1962 we received an unusual request in a letter from a collector in Darwin, Northern Territory, Australia, with whom we had been trading shells for about a year. He had bought at auction a twelve cylinder Packard automobile that had been taken to Australia by one of our Consular officials just before World War II. The car was badly in need of repair and the necessary parts were not available in Australia. He asked us to see if they could be gotten in America. Since the Packard Company was no longer in existence when we got the letter and, in any case, had not made their twelve cylinder model since he promised that we would be well paid in shells if we could get the parts and send them to him, we decided to see what could be done. Our first contact was with a former Packard dealer who had been in that business until Packard quit making cars. He gave us the address of an antique auto-parts dealer in El Monte (a suburb of Los Angeles) who



had bought the factory warehouse stock of Packard parts and might have gotten some of the twelve cylinder parts as well.

Fortunately, they had the parts we wanted and because they had bought them at liquidation prices, we were able to get them at less than a third of their original Catalog list price. The dealer included a Packard Twelve Service manual free. Needless to say, we had the parts on their way to Australia as quickly as possible.

In a few weeks we received an air parcel which contained, among other things, a nice growth series of three Volutaconus bednalli (Brazier). The largest specimen being 98.5 mm. and the smallest being 67 mm. Shortly after receiving them we traded the second largest specimen to the late Everett Stiles of Bellingham, Washington, for an extra large specimen of Arctomelon stearnsi (Dall).

I hope this will encourage those of you who have made unusual trades to write about them for future issues of The Festivus. Undoubtedly, some of you, especially those who have been stationed in the western Pacific, have some interesting accounts of how you got those goodies in your collections.

#### WSM MEETING

by Dave Mulliner

The 1970 conference of the Western Society of Malacologists was held on the campus at Stanford University. Dr. A. Myra Keen, president, presided over the three-day meeting. Among the 108 who attended were people from Japan, New York, Washington, Arizona and California.

Scientific papers were presented covering many fields: "Paleoclimatic History of the Pacific Margin" by Dr. Warren Addicott, "The Spread of the Giant African Snail to the Continental U.S." by Dr. Albert Mead, "Boring Shells Penetrating into Volcanic Rocks" by Dr. Koichiro Musuda (Japan), "Notes on Generic Names and Placement in the Muricacea and Buccinacea" by Dr. George Radwin, "The Intritacalx, A Previously Uninvestigated Surface Layer of Some Muricid Gastropod Shells" by Mr. Anthony D'Attilio, and many other interesting papers.

A symposium was given on Nudibranchs, with Dr. David Franz and Mr. Richard Roller as co-chairmen. After the Symposium, an informal slide show and discussion was held in the Serra Lounge, Mr. Larry Harris stole the slide show with the spectacular and beautiful Nudibranchs he had photographed on the Barrier Reef, Australia - all, as yet, unnamed.

Dr. Eugene Coan chaired a symposium on "Advance in Molluscan Systematics: A Survey of New Theory and Practice".

The Shell Auction was held Wednesday evening with Tony D'Attilio as auctioneer. Many beautiful and specimen shells were bought by the lucky bidders.

A field trip to the California Fish and Game Commission and the Geological Survey was excellent. The ecological balance between the otter and the abalone was discussed. If a balance is to be maintained,





man must keep his hands off. The commercial oyster industry using spat imported from Japan was explained. The tour through the Geology Sections was most interesting, with fossil shells from many sites along the coast and inland on display.

Saturday noon the last good-byes were said. We headed for home, back by the coast. We spent the night at Steve Long's home in Pismo Beach. He showed us many slides of Nudibranchs from the Pismo Beach area. The next morning, as we walked along the beach, we picked up a few *Velella* from the high tide line but we found no *Janthina* at all.

Dr. Coan, as the 1970-71 president of the WSM, has asked the San Diego Shell Club to be the host at Asilomar for the June 1971 conference. The San Diego Shell Club has accepted the invitation.

## A GOOD DAY'S DIVE

Nola Michel

Diving is always an interesting experience. Some dives are just "sightseeing" as far as collecting is concerned. Others are fantastic collecting opportunities, as was the one we were on last weekend. We were up early and at our buddy's house. Soon the truck was loaded with two more divers and their gear, headed for the boat in the Mission Bay area. Diving is heavy work, requiring loading "unteen" tanks, wetsuits, weight belts, gasoline tanks, boat cushions, etc., etc., from truck to beach and boat. And after wearing yourself out diving, you still have to haul it up the beach and home, then clean it and any "booty" obtained.

On this day we were out off Pt. Loma and suited up ready to "fall overboard" at 10 am. I was the first in the water and promptly announced it was cold, wet and there was lousy visibility. The kelp cutter had just been through the area, so we decided to go to the bottom and see if the visibility was any better there. It was. There was about 25 ft. which is good in our waters. I was buddying with my husband John. First time in ages, since he'd been overseas for some months. We had decided that we were going to thoroughly "pick apart" (look very carefully) one small area for shells.

Right at the bottom of the anchor line (65 ft.) was a likely looking pile of rocks. A quick look revealed several "scars" where red abalone had recently been removed. The commercial Ab divers had been here too. We began our minute inspection and soon had in vials the nudibranchs, *Hermisenda crassicornis* and *Diaulula Sandiegensis*, for occupancy in our salt water aquarium. Also seen were *Dendrodoris fulva*. I also picked up a small *Astrea undosa* to feed to the *Murex* from the Gulf residing in my aquarium. A short time later I found an *Astrea gibberosa*. Also taken on this tank of air were several *Amphissa vericolor*. John found a lovely pair of something we couldn't even put it in a family without a book. So we were puzzled until we looked in Jim McLean's book, "Marine Shells of So. Calif.". We found it is in the family Turridae, *Megasurcula stearnsiana*. These shells were found in the sand near the rocks--one fully exposed, the other, half buried. The shell is buff-colored, with brown color bands - the animal is a yellow color with minute white spots.



Long before our tank of air was consumed we were numbed with cold, as I had forgotten my woolen sweater to wear under my wet suit and John had grown used to the warm water in WESPAC. We came up shivering, after a half hour in the 55 degrees water. It is always that cold below the thermocline. After 45 minutes and two candy bars we were warm enough to try again. We had such good luck that we decided to try the same area again. This dive John found a Murex, Pteropurpura macroptera. I had found one on the first tank, so that gave us a nice pair. Also taken were three abalone. Two turned out to be Haliotis assimilis and one H. sorenseni. We also took home three Cypraea spadicea for the aquarium.

When we arrived home we placed all the small animals in the aquaria. After we had cleaned us and our gear and had a bite to eat we looked at them again. One of the Megasurcula had already disappeared under the sand. The other hadn't moved. Then suddenly he (she?) reached forward and down with the front part of the foot and made a forward and descending jerk. About two minutes and 10 "jerks" later only the spire of the shell showed. This animal seems to stay in that position in the tank and the other is always hidden under the sand.

It surely was a good day's dive and I just had to tell you all about it

#### COME TO THE "OKAZU" (JAPANESE LUAU) IN SEPTEMBER

(If you have any Oriental items that can be used as decorations - not fragile or precious - please offer to Nola Michel - NOW - so their use can be planned. Call 278-9088).

#### MINI MINUTES

Minutes accepted for June 18. Treasurer's report \$420.00. Winner of shell drawing, Carole Hertz. Voted to send \$25.00 to Dr. Stohler for the Veliger. Voted to host WSM at Asilomar, June '71. Voted to buy Weaver and Dupont's "Living Volutes".

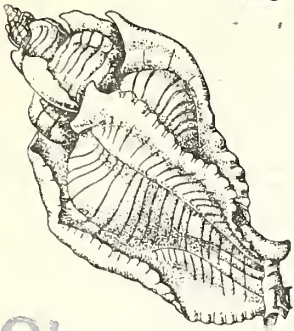
New Members: Mr. and Mrs. W. C. Browning and Family  
603 San Vincente Blvd.  
San Diego, Calif. 92114  
Phone: 463-6712





THE

# FESTIVUS



## SAN DIEGO SHELL CLUB

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Museum of Natural History - Third Thursday - 7:30 P.M.

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Editor: Blanche Brewer

Vol. I

September 1970

No. 9

\*\*\*\*\*  
\* COME TO THE OKAZU (WITH RICE) \*  
\* \*  
\* Date: Friday, September 18, 1970 Place: Hertz Oriental Gardens\*  
\* Time: Happy Hour 6:30 P.M. 3883 Mt. Blackburn Ave\*  
\* San Diego \*  
\* Dinner --- later Dress: Your best Oriental \*  
\* Finery \*  
\* (Directional map with "Bringems" on last page) \*  
\*\*\*\*\*

### PATTERNS IN CONUS TEXTILE AND OMARIA COMPLEXES

by Anthony D'Attilio

Although much has been written on the problems of the taxonomic relationship of certain *Conus* groups, no attempt has been made as far as this writer knows to study the characteristic color patterns and designs. Two groups will be here described and illustrated with the object of making certain relationships apparent. It is hoped that this will be of use to amateur collectors who are confused by the multiplicity of names encountered when dealing with what may well be only a few polymorphic species. No conclusions are to be drawn, however, as to the ultimate specific validity of these names without including essential data drawn from the broadest possible study of the total animal, a task well beyond the scope of this paper.



## PART I: TEXTILE GROUP

The first group to be dealt with is *Conus textile* Linne, and those species and varieties which partake closely of the same pattern scheme. The common form of *Conus textile* found throughout the Indo-Pacific, on the basis of color and design, will be found in detail to look like Figure 1. There are, as can readily be seen, two motifs in this illustration. These are modified from specimen to specimen throughout its range. Figure 1a shows the motif of triangular markings and Figure 1b shows the second motif. In general these two motifs are interwoven over the entire shell in the majority of specimens. The extreme examples would be shells having only motif 1a or 1b over the complete shell. A large series of specimens from the entire range would show all combinations of these characters up to both extremes. Undiscriminating students might find such forms tempting for the creation of new names, especially when such examples are found in conjunction with variations in spire height, degree of obesity, and angularity of shoulder.

Another character in the pattern development of *Conus textile* is the tendency of this design to arrange itself in spiral bands. A stylized rendition of this banding is shown in Figure 2. This banding is modified at times even on individual shells, so that one side of the shell is only poorly banded while the reverse side is well marked. A further modification, and one responsible perhaps for a number of specific names, is the size of the two basic motifs in proportion to the size of the shell. At times, for reasons best known to Nature herself, the white triangular markings are all of very small size and the general tone of the shell thereby also becomes relatively dark, due to the greater proportion of brown that outlines the white markings. Such shells are in addition sometimes flushed with a grey-blue color adding to their darkness. Whether due to ecologic or other conditions not understood, colonies of such shells may live in areas inhabited at the same time by more typical populations.

Melvill's arrangement of the *Conus* complex under discussion is pertinent. (Melvill, Revision of Textile Cones, Journal of Conchology, IX, pp. 305, 310.) Although it does not necessarily coincide with the writer's opinion in detail, it should be studied for one possible way of understanding the interrelationships. A word of necessary warning that cannot be too often expressed is to remember that the names here used are to be considered valid only when proven to be the original author's concept of that species, and this is possible only by a comparison of the original types. It is more than probable that no student has yet checked all these names against types and therefore, all names here used are to be accepted only provisionally as the author's species.

Group III, *TEXTILIA* of Melvill's subgenus *Cylinder* Montfort is broken down into three separate subgroups as shown below:

(a) *Conus textile* Linne

- |                               |                                 |
|-------------------------------|---------------------------------|
| 1. <i>tigrinus</i> Sow.       | 5. <i>scriptus</i> Sow.         |
| 2. <i>vicarius</i> Lam.       | 6. <i>canonicus</i> Hwass-Brug. |
| 3. <i>verriculum</i> Reeve    | 7. <i>condensus</i> Sow.        |
| 4. <i>concatenatus</i> Kiener | 8. <i>dalli</i> Stearns         |





- (b) *Conus abbas* Hwass-Brug.  
 " *Panniculus* Lam. var. *Textilinus* Kiener  
 " *corbula* Sow. var. *eutrios* Sow.  
 " *archaepiscopus* Hwass-Brug.  
 " *victoriae* Reeve var. *complanatus* Sow.  
 " *cholmondeleyi* Melvill  
 " *prevosti* Sow.

- (c) *Conus pyramidalis* Lam. var. *convolutus* Sow.  
 " *gloriamaris* Chem.  
 " *legatus* Lam.  
 " *paulucciae* Sow.  
 " *telatus* Reeve

#### PATTERNS IN CONUS TEXTILE

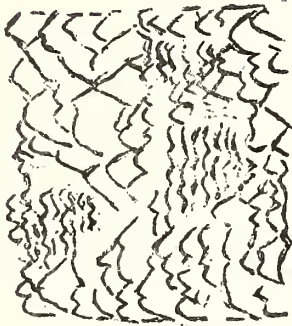


Figure 1



Figure 1 a

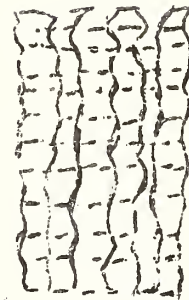


Figure 1 b

Color of motif Figure 1 a: White background, markings are delineated with brown lines.

Color of motif Figure 1 b: Wavy axial lines sometimes more faintly crossed by spiral lines. These lines are of the same brown color as those defining the white markings in the previous fig. A lighter shade of the same brown color forms the ground color of the shell wherever the pattern of fig. 1 b is dominant.

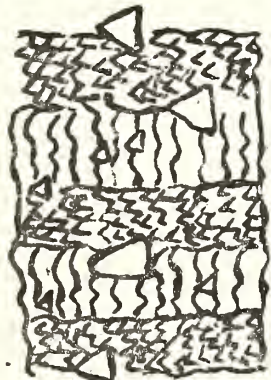


Figure 2

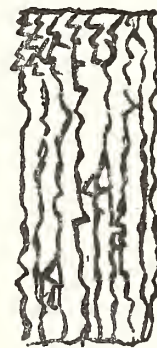


Figure 3

Figure 2 shows the two motifs arranged in a more regular banded pattern with sporadic white markings floating across the intervening areas of axial wavy streaks.

Figure 3 The white markings are shown here reduced to small size and turning at times into almost parallel zigzag lines. Although seeming to imitate the character of motif in fig. 1 a, the ground color remains that of the white markings.



## PART II: THE OMARIA-PENNACEUS COMPLEX

Collectors have frequently lumped together all their difficulties in unraveling the "Tent cones", as though there were little to distinguish the Textile from the Omaria series or for that matter the Mar-moreus complex. If their style of color and ornamentation is studied however, it becomes apparent that there can be no mistaking the larger groupings. Nonetheless, once these "species" have been separated into definite groups, the real difficulties become apparent. As relative size and shape of the shell afford the only distinguishing basis for species differentiation among many of the textile cones, so the same can be said of the omaria series. If anything, specific characters in the latter group are more fluid and intergradation even more marked among many if not all species.

A diagnosis of the ornamentation of these shells discloses the following: The body color is typically a rich red to yellow brown; variations occur and individuals may have a fairly light brown, orange, or golden color. Since dead shells, normally brown when alive, fade to a golden color after lying exposed on tropical beaches, none but live collected material should be used for study purposes.

All the "species" in this series have the body whorl encircled with what might be described as narrow fillets. These fillets are, as here illustrated, decorated with white and dark alternate dashes or dot and dash, to which the application of the word "necklace" might be equally as well applied. These fillets may be slightly or strongly raised from the surface; they may be very apparent as a rich ornamentation, or very obscure and visible only under magnification.

Further ornamentation consists of white trigonal markings which are sometimes relatively large and scattered loosely over the shell; in other species these markings are small, gathering themselves into spiral bands or diagonal chains. At times in addition some of these trigonal markings substitute for some of the white dots or dashes on the fillets. A series of such trigonal dots on the fillets may gradually increase in size spirally in the direction of shell growth and then scatter over the shell. (Figure 1, much enlarged.)

Other characters noted:

1. The fillets do not appear on the spire of the shell although the white trigonal markings do occur there.
2. The trigonal markings are mostly uncolored, but in one species the white is partially shaded with a darker violet gray (*Conus praelatus* Hwass-Bruguiere).

The ornamentation of the above enumerated forms undergoes many variations. Nature always has her many little surprises, and here it is well to be on watch for clever and subtle variations. To give an example, in such wide spread areas as Hawaii and Mozambique, two species inhabiting these waters demonstrate similar variations. Although not exceptionally difficult to describe and illustrate, the actual shells must be studied to realize the transformation that the design elements above described undergo.

The trigonal markings become extremely small and crowded; the fillets, usually well separated, now are almost touching; and the whole resembles a very fine design of whitish threads running horizontally or





As previously indicated, there is no attempt here to evaluate the specific validity of these forms. The attempt is rather to make relationships clearer and to facilitate the division of the more complex groups.

Figure 1

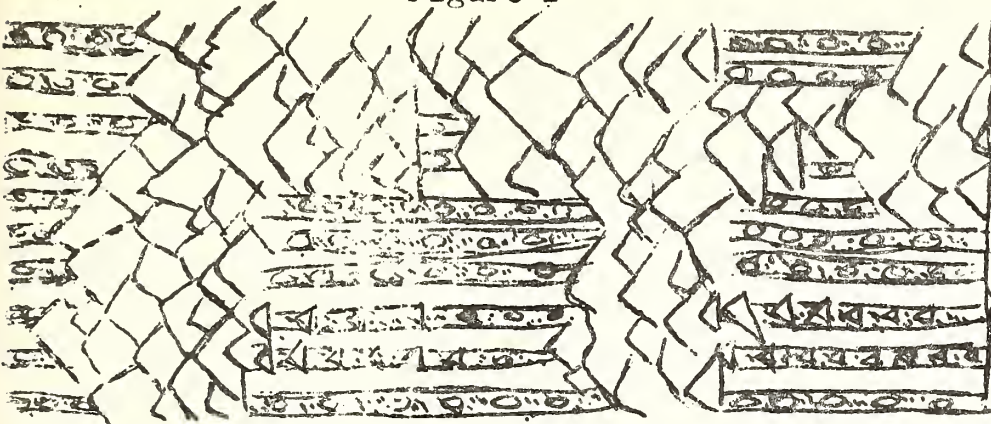
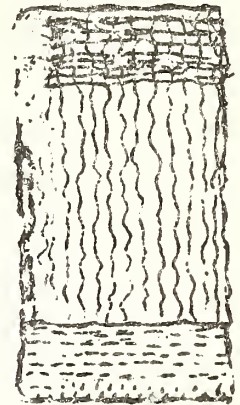


Figure 2



Melvill's (see "NOTES" No. 59) proposed classification of this complex is as follows:

(a) EPISCOPI

*Conus episcopus* Hwass.

*omaria* Hwass

1. *pennaceus* Born

2. *rubiginosus* Hwass

3. *magoides* Melvill

4. *marmoricolor* Mel.

5. *madagascarensis* Sow.

*Conus praelatus* Hwass

*elisae* Kiener

(?) *aulicus* Linne

1. *propendus* Melvill

(?) *auratus* Hwass

*magnificus* Reeve

(b) CROCATI

*Conus colubrinus* Lamarck

*crocatus* Lam.

*racemosus* Sowerby

The position of the (b) *crocati* group would be difficult to understand due to the extreme scarcity of any specimens for study.

In addition, *Conus stellatus* Kiener should be added to the (a) EPISCOPI

In conclusion, two additional names should be considered:

1. *Conus aureus* Hwass-Brug. The distinctive color pattern and form relate this species closest to the textile series. The strong close set raised striae are nonetheless specifically distinctive.

2. *Conus auricomus* Hwass-Brug. Superficially resembles some forms of *auratus* or *aulicus* but is readily distinguished from any species in Melvill's EPISCOPI by a complete lack of any color or ornamentation on the strong revolving striae.

Relationship between *C. aulicus* Linne and *C. auratus* Hwass and the other species of Melvill's "EPISCOPI" is doubtful.

(The change in our scheduled program for August has a "Pain-Full" explanation. Twila Bratcher has been having trouble with her back. Still unable to be upright for any length of time, she considered traveling ambulance-style in their station wagon to keep her promise to us, but we could not accept such sacrifice.



Tony D'Attino came to the rescue with the above presentation, for which we thank him, very much.

We hope that Twila, fully recovered, will be able to come in October)

## SHELLING NEAR LA PAZ

Roland Taylor

As we have all repeatedly experienced, mollusks tend to disappear with the encroachment of so-called civilization. Licenciado Luis Echeveria A. has guaranteed Baja California a paved highway from Ensenada to the Cabo by 1973. However, long before this, the devastating influx of the "Gringo" shellers have covered the area from La Paz to the Cabo with fine-tooth combs and scuba equipment.

It is therefore surprising to find, within easy reach by a standard vehicle, any mollusks whatsoever in this area.

January 19, 1970 found us at afternoon low tide at Balandra, some four miles beyond Pichilingue, which is 11 miles below La Paz. The beach here slopes gradually, and as the tide recedes there are some 300 yards of beach exposed. The beach is in a cove with rock areas on both sides. In the shallows were giant needlefish and small octopi and in the rock area, one or two fairly large Conus princeps Linnaeus. In the sand, fairly high up, were Polinices bifasciatus (Gray), lots of Sanguinolaria nuttali, a few Cassis centiquadrata, Valenciennes, together with Terebra variegata Gray, and T. specillata Hinds. There were some Oliva polpasta Duclos.

January 21, 1970 found us below Punta Coyote, and there in lava formations, we found Cypraea annettae Dall, Conus nux Broderip, C. brunneus Wood, and to our surprise, 2 specimens of Cypraea isabella-mexicana Stearns, which have normally been reported from offshore islands, with an occasional report from the mainland.

January 22, 1970, we returned to a beach where the year previous, we had found a profusion of Strombus gracilior Sowerby; and to our surprise, since this beach is between Pichilingue and La Paz, and directly on the paved road, we found probably a thousand S. gracilior and a few S. granulatus Swainson. Of course, we took only a very few and sincerely hope that those who find the area subsequently, are also conservation-minded.

## DISCOVERY

By Barbara W. Myers

It was a sparkling December day, 1967 and John and I were snorkeling off La Jolla Shores. The ocean was almost flat calm and visibility about thirty to forty feet. At a depth of about fifteen feet, we observed many more rays and starfish than usual. Also noted several Polinices recluzianus, Nassarius fossatus and N. perpinguis. I spotted several specimens of an unusual egg case floating on the bottom, jelly-like, about five in. long and about three fourths in. in diameter.





As we swam out into deeper water, we found these egg cases attached to the bottom and the deeper we went the more plentiful they were. Then incredibly, I saw what I knew instantly was a squid, although I had never before seen one except in pictures. The mollusk seemed to be trying to dig itself into the sandy bottom. It was hard to believe my eyes as I had always read that they were extremely elusive and possessed of amazing swimming speed. Yet here were several of these creatures, as we hovered over them, just apparently digging in the sand. That they saw us there could be no doubt -- their eyes were large and fixed on us. About ten in. to a foot long they were of a pearly iridescence. Out deeper in the canyon there were masses of them.

I brought home four of them thinking to watch them in my aquarium, but they did not survive more than a couple of hours. As I ran my finger up and down the body, color dots would appear in a changeable pattern. They were soft and fragile.

We later learned they were Loligo opalescens. The females were in the act of depositing the egg cases on the sandy bottom. Both the male and female die after spawning and the eggs hatch within 35 days. They come from the deep ocean to spawn in depths between thirty to 60 ft..

#### BOOK NEWS

Recently, many members of the San Diego Shell Club have shown increased interest in microscopic shells, some no larger than a grain of sand. There are many reasons for this interest, but perhaps the best is the beauty and delicacy to be found in these tiny shells. Searching through grunge is painstaking, but the reward is often great. A good hand lens is a necessity, if a microscope is not available. Photographing these shells is also very rewarding, since some of the results can be breathtaking.

The collector of microscopic shells is often deterred by the lack of sources for identification. Books specifically devoted to minute shells of the Western USA or the Panamic region are sorely needed. However, Shell Club members have many soft covered pamphlets dealing with various families of microscopic shells available to them in the Shell Club library. Although very old, these pamphlets and papers offer hours of interesting reading. In addition, they offer a source of identification. Some of these pamphlets are listed below:

- "New Mollusks of the Family Vitrinellidae from the West Coast of America" by Paul Bartsch, 1907
- "Descriptions of New Mollusks of the Family Vitrinellidae from the West Coast of America" by Paul Bartsch, 1911
- "The West American Mollusks of the Genus Triphoris" by Paul Bartsch, 1907
- "Summary of the Marine Shellbearing Mollusks of the Northwest Coast of America from San Diego, California to the Polar sea, Mostly Contained in the Collection of the United States National Museum, With Illustrations of Hitherto Unfigured Species" by William Healey Dall, 1921
- "The Pyramidellid Mollusks of the Oregonian Faunal Area" by William Healey Dall and Paul Bartsch, 1907
- "Notes on Japanese, Indopacific, and American Pyramidellidae" by William Healey Dall and Paul Bartsch, 1906



August 25, 1970

Mrs. Carole Hertz  
San Diego Shell Club  
San Diego, Calif.

Dear Madame President:

Please convey my sincere thanks to the members of the San Diego Shell Club for their most recent generous donation to the Veliger.

As you all know, all contributions are "put to work" by placing them in the Endowment Fund. This fund is irrevocably dedicated for the purpose of helping defray expenses of producing the Veliger. Sometimes, the income from the fund can be used to pay for the cost of some illustrations, which normally should be paid by the author, or in other ways to help an author whose financial situation is not very affluent. If no such need is present, the income can be used to help keep the membership dues at their low level. Thus, the contributions from the San Diego Shell Club are most helpful, not only once, but they will keep on being helpful in all the years to come, as long as the Veliger may continue. And, should ever the Veliger cease, then the funds will be used for scholarships.

Again, on behalf of the Veliger, my warmest "thank you all" to the Club and many personal thanks for the friendship the many members have given me.

Sincerely yours,  
Rudolf Stohler

#### ANOTHER STANDARD HAS FALLEN

Clifton L. Martin

Throughout the history of shell collecting there have been many standards established by which other shells have been judged. When considering new specimens for our collections we all have standards of size, color, perfection etc. by which we judge a shell before it is added to our collection. These standards are usually arbitrary and will vary from one collector to another. Sometimes they will vary from one locality to another. For example, we would not expect a Conus leopardus found on the Great Barrier Reef or from the Philippines to be as large as the gigantic specimens found in Hawaiian waters. There are also standards that have been universally accepted, such as the type specimens designated by authors when a new species has been described and named. These are the standards by which a species is judged and, of course, are not arbitrary and they do not change.





Among other standards that have become universally accepted, more or less, are those pertaining to rarity. We often hear the rarity of a shell being compared to that of Cypraea aurantium, or to some other very rare shell. In this way Cypraea aurantium has become a standard of rarity. One shell that was a standard of extreme rarity for almost a century was the "Precious Wentletrap", Epitonium scalare. On those rare occasions when one was offered for sale during this long period the price was far beyond the means of any but the most wealthy collectors. Many articles have been written about the fabulous prices paid for them. However, in the early years of the nineteenth century Epitonium scalare began to appear in ever increasing numbers and it became apparent that it was neither especially rare or very limited in range. It was no longer useful as a standard of extreme rarity and today it is seen in almost all collections.

Many other shells were used as standards of extreme rarity after Epitonium scalare was toppled from the throne. Many of these did not become established as standards beyond the area of their habitat. Others, such as Scaphella junonia achieved much wider recognition but did not hold the position long because of the frequency of new finds. Many others had their day or two of fame and were retired from the contest.

Then, almost miraculously, another standard began to gain universal acceptance. Conus gloriamaris was described by Chemnitz in 1777 and more than a century later, in 1887, there were only twelve known specimens in the entire world. New ones were found only on extremely rare occasions and as recently as 1961 an eminent British malacologist estimated that there were only twenty-five specimens known to exist. When we heard a shell's rarity being compared to that of Conus gloriamaris we knew the shell was extremely rare. There was some speculation prior to 1957 that Conus gloriamaris may have become extinct. Then in 1957 a single specimen was found off Corregidor Island, in the mouth of Manila Bay, in the Philippines. It was collected alive and was the first authenticated find in more than sixty years. Six years later, in 1963, the discovery of two new specimens was announced to the world at Rabaul, New Britain, in the Trust Territory of New Guinea. These two shells were found by native divers and since that time this area has produced an ever increasing number of them. When Van Nostrand's Standard Catalog of Shells, second edition, was published in 1967 there were seventy known specimens in the world.

From the twenty-five specimens known in 1961 the number has steadily increased until today, less than a decade later, there are perhaps ten times that number. It is very doubtful if any reliable data exists as to the exact number of specimens there are today but it will certainly exceed two hundred and may be much more than that.

So our standard of extreme rarity has fallen. What will take its place? Will it be another cone shell? There are several of them that are rarer than Conus gloriamaris was at the turn of the century. Or will the new standard be a Cypraea, or a Voluta, or a Murex, or what? All of these have likely candidates for the position. One thing is for sure, it will be an extremely rare shell and will be distinctive enough to have universal appeal. Judging from the past it will also have certain size limitations and will be neither very small or very large but will fit well into the collector's cabinet.



Until the new one is found we will have to go back to the hodge-podge of miscellaneous shells of extreme rarity for our own personal standards. Out of this melting-pot will probably emerge the new monarch. However, it too will have a reign of limited duration and will eventually be toppled from the throne.

### MINI MINUTES

Tony D'Attilio graciously substituted for Twila as speaker and Dave Mulliner showed slides of the Shell Auction and the WMS meeting. Mini minutes for July 16th accepted. Treasurer's Report was still \$420.00! Billee Dilworth and Betty Baker volunteered cookies for next regular meeting. Kay Taylor won shell.

Mr. & Mrs. Jules Hertz  
3883 Mt. Blackburn Ave.  
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Mrs. G. A. Honselman  
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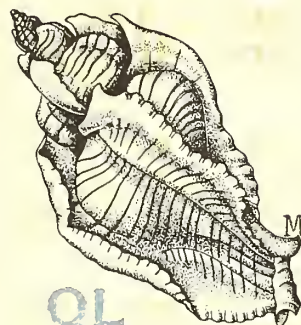
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# FESTIVUS

## SAN DIEGO SHELL CLUB

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Museum of Natural History - Third Thursday - 7:30 P.M.

President: Carole Hertz  
Vice President: Nola Michel  
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Corresponding Secretary: Barbara Good  
Treasurer: Margaret Mulliner  
Editor: Blanche Brewer

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\* PROGRAM FOR OCTOBER 15 \*  
\*  
\* Terebridae: Twila Bratcher \*  
\* Surprise Slides: Dave Mulliner \*  
\* Publication Address: \*  
\* Virginia Hanselman, 5818 Tulane St., San Diego, Ca. 92122 \*  
\*\*\*\*\*

### THE "OKAZU"

The club's "OKAZU", held at Jules & Carole Hertz Oriental Gardens on Friday evening, Sept. 18th, was an ichiban success. Softly lighted Japanese lanterns hung from the trees, and the Gardens were very festive with their Oriental decorations. There was even the mystic music of the Orient and an occasional tinkle of windbells.

Dave's surefire champagne punch made Happy Hour even happier, and many delectable appetizers were enjoyed with it. Sukiyaki, with rice, was served as the main dish at supper, with fruits and other interesting dishes to choose from. Low tables were set on the lawn, and seated on Zabutons, we all enjoyed the delicious food. Some struggled with chopsticks, some managed theirs with a flair, and a few pikers used spoons. Green tea was served, and for dessert, the fortune cookies held fortunes particularly appropriate to all good shellers. (I quote: "Bad tempered shell collector has short fusus"!)

Among the guests were those in native, and not-so-native, dress of Japan, China, and India. and even a few from the Islands. All were colorful and fun. We were very happy to have with us for the evening, Dr. Okutani, who is here from Japan and presently doing some work at Scripps. We thank Carole and Jules for sharing their home with us for the occasion. It was a delightful, fun evening.

Virginia Hanselman

## SPIRULA

Class---Cephalopoda  
Family--Spirulidae

Genus-----Spirula Lamarck, 1799  
Species---Spirula spirula (Linn.)  
1758

Spirula belongs to the sub-order Sepioidae, and is thus akin to the Cuttlefish. There is only one species, *Spirula spirula*. Found in nearly all tropical and sub-tropical seas, it lives at depths between 600 and 3000 feet.

This little squid-like animal has a cylindrical body rarely measuring more than one and one half inches excluding the tentacles. *Spirula* has eight arms and two tentacles which measure about one and one half inches when fully extended, thus giving an overall length of three inches.

When it is swimming, the two small end-fins frequently aid the jets from the funnel by constant fluttering movement. Placed in an aquarium, they are seen to swim with jerky, backward spurts of jet-propelled motion. Between the fins there is a circular disk, with a small bead-like organ in the center, that emits a steady, yellowish-green light which 'burns' for hours on end. This disk acts as a top-light - its function is probably to enable a school to keep together. The normal position of *Spirula* is vertical, with the arms hanging downwards. Its movements are mainly vertical, up and down, through half a mile of sea-water.

Inside the top end is a small shell, which is completely enclosed by the mantle, despite statements in numerous text books to the contrary. The late Dr. Anton Fredrick Bruun, the Danish Zoologist and Oceanographer, observed *Spirula* alive and dead. X-ray and photographs had proven this. In this little shell, curved like the horn of a ram, we have one of the few persisting reminders of the days when great, spiral-shelled 'cuttle fish' swarmed in the oceans of the Jurassic and earlier periods.

The shell is divided into 25 to 37 chambers which are filled with gassy air. A delicate, hose-like extension of the body, called siphuncle, runs through them. The coiled, chambered shell is entirely buried in the body of the living animal, somewhat posteriorly. It keeps the animal suspended head downward and acts as a hydrostatic organ.

In the several centuries that men of inquiring mind have been walking the world's shores, many unknown animals have been discovered as strays from the open ocean in the flotsam of the tide lines. One such mysterious link, between the open sea and the shore, is the ramhorn shell, *Spirula*. For many years only the shell had been known - a small white spiral forming two or three loose coils. By holding such a shell to the light, one can see that it is divided into separate chambers, but seldom is there a trace of the animal that built and inhabited it.

By 1912, about a dozen living specimens had been found, but still no one knew in what part of the sea the creature lived. Then Johannes Schmidt, the famous Danish marine biologist, undertook his classic researches into the life history of the eel, crossing and recrossing



the Atlantic and towing plankton nets at different levels from the surface, down into depths perpetually black. Along with the glass-clear larvae of the eels that were the object of his search, he brought up other animals, among them many specimens of *Spirula*, which had been caught swimming at various depths, down to a mile. In their zone of greatest abundance, which seems to lie between 900 and 1500 feet, they probably occur in dense schools.

It may seem mysterious that the remains of such a deep-sea animal should come to rest in beach deposits, but the reason is after all, not obscure - the shell is extremely light. When the animal dies and begins to decay, the gasses of decomposition probably lift it towards the surface - there, the fragile shell begins a slow drift in the currents, becoming a natural 'drift-bottle' whose eventual resting place is a clue, not so much to the distribution of the species as to the course of the currents that bore it. The animals themselves live over deep oceans, perhaps most abundantly above the steep slopes that descend from the edges of the continents into the abyss. In such depths they seem to occupy tropical and sub-tropical belts around the world. When the animal dies and its fleshy material deteriorates, the shell is released and floats to the surface.

Dr. Bruun made detailed studies of the vertical distribution of the animal and concluded that it lives in the mesopelagic region, or below the zone of light penetration. *Spirula* does not approach the surface closer than about 100 meters. (approximate=325 feet).

Excerpts from "The Biology of *Spirula spirula* (L)--by Dr. Anton Fredrick Bruun.

Contributed by Neil M. Hepler, who gave permission for its use to Emma West.  
(we are doubly grateful. Ed.)

#### A REMEMBERED TRIP

by Clifford A. Martin

Most shell collectors can remember one shelling trip that they enjoyed more than any other. The trip I remember most is the first time we went down to San Felipe. I had never been to the Gulf of California before and looked forward to going with great anticipation. That was back in 1955 and the shelling was still good there at that time.

We decided before we went that we would try to collect at least two good specimens of every species we could find. Our collection at that time consisted mostly of California shells which we had collected here in San Diego County.

When we arrived in San Felipe we were amazed at the quantity of shells around the rocks and on the beach. Actually, a person couldn't take a step without stepping on *Tegula rugosa* or *Cerithium stercusmuscarum*. The *Cerithiums* were there by the thousands. The intertidal area was almost black with them in some places.



We spent three days shelling and found nice specimens of Muricanthus nigritus, Hexaplex erythrostomus, Conus regularis, two species of Cantharus, Strombus gracillior, Turritiella anactor and many others. Altogether we collected more than seventy-five species of shells, most of which were new to our collection.

When we returned home and got down to the "dirty work" of cleaning our shells you can imagine our surprise at discovering that we did not have a single specimen of Cerithium stercusmuscarum in our loot. It was the most plentiful species in the area and we had failed to collect a single one.

## BOOK NEWS

Jules Hertz

The Shell Club library has received two donations that are not directly related to molluscs but which will be of general interest to those interested in the ocean and its inhabitants. Clifford & Clifton Martin have donated a newly published, soft-covered book, Starfish by Marjorie Furlong and Virginia Pill. This is a beautifully illustrated book dealing with the sea stars (starfish) of the Pacific Coast, Alaska, Mexico and Hawaii. Although aimed at the non-scientific public, the book gives considerable scientific data about the phylum Echinodermata as well as the specific sea stars being described. There are excellent directions on methods of preserving sea stars, and the color photographs and fine descriptions will be of invaluable aid for identification. This book is a must for those who love to beachcomb and enjoy our natural surroundings.

Barbara Good has donated a Directory of the Public Aquaria of the World which she obtained in her recent trip to Hawaii. Prepared by Karean Zukeran, Charles DeLuca & Spencer Tinker, the purpose of this directory is to bring the public aquaria closer together in order that they may assist each other in exchange of ideas & exhibits. The book lists the specimens which each aquaria would donate, exchange or sell to other aquaria.

Other additions to the library are the July and August issues of the Oregon Shell News, new book list from W & R McCauley, Summer 1970 issue of Of Sea & Shore, and most of the 1970 issues of Environment Southwest.

## AQUARIUM OBSERVATIONS

Carole M. Hertz

We thought that perhaps the reason our Cypraea spadicea had attacked & eaten the anemone in our tank was that the anemone had been sick or weak.

Now we'd found another healthy anemone attached to a small rock. We brought it home--still on its rock and placed both in our tank. Within several hours this new anemone was "swimming" around the tank with the cowry in hot pursuit. The cowry killed it in several days and by the end of a week there was no trace of the anemone. The stalking spadicea had struck again.

Page 5

NOTES ON OLIVELLA BAETICA CARPENTER

by Clifton L. Martin

In a recent exchange of shells with a collector in the Los Angeles area we received some shells from two rather old collections. One of these was the R. H. Tremper Collection and the shells we received were collected between the years of 1904 and 1925. All of the shells we got in this exchange were from the California coast and most of them were from the Los Angeles County and Orange County areas.

Two specimens of Olivella baetica Carpenter are quite remarkable when compared to specimens found today. These two shells are from a lot that was collected at San Pedro, California, 1904, and are giants for the species. The larger specimen measures 22.1 mm. and the smaller is 21.8 mm.

A portion of the Tremper Collection was purchased by the Agassiz Nature Club in 1934 and in 1957 was donated, together with shells from other prominent collections, to the University of California at Long Beach. The shells in our collection are from the surplus material, which was not sent to the University.

It is interesting to note that other specimens of Olivella baetica in our collection from the Tremper Collection and collected in the same area in 1924 are much smaller. The largest of twelve specimens being but 15.3 mm. This compares favorably with specimens we collected at Agua Hedionda Lagoon, south of Carlsbad, 1959, the largest of which is 15.7 mm.

The record size for this species, as posted in the Lost Operculum Club List of Champions, published by the Conchological Club of Southern California, measures 19 mm. in length. While this is not nearly as large as either of our two specimens I must confess that the lot from which ours were selected contained other specimens that may have been larger. Although we did not measure it a gigantic specimen in the collection from which ours came appeared to be at least one inch in length. Also, it must be remembered that these shells came from the surplus material of the Tremper Collection and specimens much larger than ours may have been among the shells donated to U.C.L.B.

A WEEKEND IN SANTO TOMAS

by Carole M. Hertz

On Friday afternoon, August 14, the Mulliners and the Hertzes took off in the Mulliners' rolling rancho for Santo Tomas. Santo Tomas, on the ocean about 50 miles south of Ensenada, is a quiet little fishing fillage as yet undiscovered by the tourists.

We set up camp that evening on a bluff overlooking the ocean and the cove of Puerto Santa Tomas. A quick supper, a slow Kahlua and it was time to count the stars to sleep.



Saturday morning looked like rain and dirty water for diving but Jules encouraged Dave and me to "get wet anyway" and we were glad he had. The visibility was quite good and "getting wet" is always a delightful if somewhat chilly pursuit. The weather and water improved steadily and it was soon sunny and clear for our mini-vacation. We were thrilled to find Bursa californica which was "new" for both Mulliner and Horta. Also found were many Cypraea spadicea, all much lighter in color than those found here. However, very few were taken since all were pitted on the dorsal side to some extent. We wondered what could cause this condition but there was no obvious explanation.

We also found Mitra idae, Norrisia norrissi, Crepidula norrisiarum, Acanthina lugubris, two species of Calliostoma (as yet unidentified by this author), Anomia peruvianus and in grunge collected from our dives Jules identified two species of Lirularia--acuticostata and succinta. We found several species of nudibranchs also: Laila cockerelli, Chromodoris macfarlandi, Dendrodoris fulva, Cadlina sedna, Isodoris nobilis and one not yet identified by Dave.

While Jules remained on the rocky excuse for a beach, acting as a combination lifeguard and babysitter, he collected some of the best finds. The Mexican fishermen had just brought in a load of abalone and cleaned out the meat. They took the meat and all the "good" abalone shells and left the entrails and the few "too small" Haliotis sorenseni and assimilis behind. Jules gloated that he'd done as well as we--and without a wetsuit!

We met two fishermen from California who were relaxing just like us and they provided us with a royal Sunday feast--fresly caught and filleted rock cod. First time I'd ever had rock cod, bacon and eggs for breakfast. Marvelous!!

All too soon it was Sunday afternoon and time to return home. With the exception of a flat tire it was a smooth trip. We sailed right across the border--an unbelievable feat for a camper--at 5 P.M. on a Sunday evening--in Tijuana.

#### NEW MEMBERS:

Walker, Dr. Vivian  
819½ S. Coast Blvd.  
La Jolla, Calif. 92037

Windmiller, Mrs. Erla N.  
9145 Elk Grove Blvd.  
Elk Grove, Calif. 95624

#### CHANGE OF ADDRESS:

Dept. of Malocology  
Academy of Natural Sciences  
Nineteenth and The Parkway  
Philadelphia, Pa. 19103  
ATT: Mrs. Morgan C. Rulon

Webb, Ray & Kay  
501 Anita St., Space 186  
Chula Vista, Calif. 92011  
420-4900

<u>Day</u>	<u>Date</u>	<u>San Diego (PST)</u>	<u>(Guaymas) (MST)</u>	<u>Pto. Penasco</u>
------------	-------------	------------------------	------------------------	---------------------

OCTOBER

M	12			0600 -2.5'
				1830 -3.0'
T	13	1406 -0.4'		0640 -3.2'
				1900 -3.8'
W	14	1454 -0.9'		0720 -3.0'
				1930 -3.8'
Th	15	1536 -1.0'	1624 -0.3'	0800 -2.1'
				2000 -4.2'
F	16	1624 -0.9'	1700 -0.3'	2030 -3.8'
S	17	1712 -0.6'		
Th	29			1840 -3.1'
F	30	1524 -0.4'	1554 -0.5'	1910 -3.2'
S	31	1600 -0.4'	1630 -0.6'	1940 -2.9'

NOVEMBER

T	10			1740 -3.4'
W	11	1400 -1.0'	1506 -0.8'	1810 -4.0'
Th	12	1448 -1.3'	1536 -1.0'	1840 -4.6'
F	13	1530 -1.4'	1612 -1.2'	1910 -4.2'
S	14	1612 -1.2'	1648 -1.1'	1940 -3.8'
S	15	1700 -0.9'	1724 -0.9'	





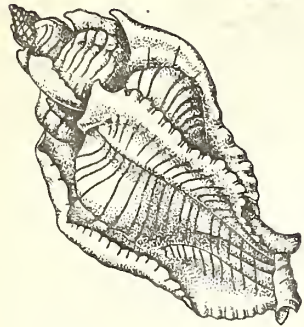
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## SAN DIEGO SHELL CLUB

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Museum of Natural History - Third Thursday - 7:30 P.M.



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Vice President: Nola Michel  
Recording Secretary: Barbara Myers  
Corresponding Secretary: Barbara Good  
Treasurer: Margaret Mulliner  
Editor: Blanche Brewer

Vol. 1

November 1970

No. 11

\*\*\*\*\*  
\* PROGRAM FOR NOVEMBER 19 \*  
\* Dr. Takashi Okutani speaks on Japanese Malacologists \*  
\* PUBLICATION ADDRESS: \*  
\* Virginia Hanselman, 5818 Tulane St., San Diego, Calif. 92122 \*  
\*\*\*\*\*

### NOTES ON TEREBRIDAE OF THE EASTERS PACIFIC

By Twila Bratcher

Terebra may be separated from other slender, many whorled, somewhat similar shells by the following: The nucleus is never hetrostropic (with the first turns resting at right angles to the following whorls). The most prominent plication will be at the anterior end of the columella not at the posterior end. The columella always is visible, sometimes with one or more plications, sometimes without. There always is a siphonal fasciole. The anterior canal always is visible from the dorsum side. There are no swollen varices. Using these diagnostic features, Pyramidella, Turbonilla, Turritella, and Cerithium, and other genera may be distinguished from Terebra.

Though sculpture, color, and spical angle vary greatly in many terebrid species, there are shell characteristics which do not vary within a species: shape of nucleus; plications of the internal columella; outline of whorls (concave, straight, or convex.)

Among the most variable of eastern Pacific Terebra are T. robusta Hinds (syn: T. Lungualis Hinds, and T. dumbauidi Hanna and Hertlein), which varies greatly in spical angle; T. tiarella Deshayes (syn: T. fitchi, Berry), which varies as to color and number of nodes in sub-sutural band; T. strigata Sowerby, which may be smooth or ribbed and also may be lacking in the typical brown axial stripes; T. elata Hinds (syn. T. ira Pilsbry and Lowe), which varies in color pattern and sometimes is very slender, sometimes obese.



Species of eastern Pacific Terebra which easily could be mistaken for one another are: T. cracilenta Li, which usually is a warm flesh color, has an elongate aperture and a laminated columella, and T. tuberculosa Hinds which generally is grayish, has a less elongate aperture, no lamination of the columella, and whose nodes do not seem to be formed from axial ribs as do those of T. cracilenta: T. rufocinerea Carpenter, also noded, may be separated from the two just mentioned by its many tiny nodes on the early whorls as opposed to two rows in the other two species and by its definite spiral sculpture; T. intertincta Hinds may be separated from T. variegata Gray by its concave whorls and row of nodes posterior to the suture and at the periphery of the body whorl; T. larvaeformis Hinds (syn: T. isopleura Pilsbry & Lowe) has convex whorls, few wide spaced slanting ribs, and subsutural band marked by broken lines, while T. puncturosa Berry has flat sided whorls, more and straighter ribs, with subsutural band marked by punctations; T. ornata Gray has smooth early whorls, short body whorl, and a very sharp plication at the extreme anterior end of the columella, T. robusta Hinds has very heavily sculptured early whorls, longer body whorl and more elongate aperture, the most outstanding feature of T. formosa Deshayes is that the subsutural band occupies about two thirds of both early and later whorls. T. formos's background color usually is white in contrast to the beige of the other two spotted species. The color of T. albocincta Carpenter does not seem to vary from the rich brown with whitish subsutural band spotted with brown. It may be distinguished from T. glauca Hinds and T. variegata, whose color sometimes is similar, by the axial ribs which are inflated at the anterior end, seeming to overhang the suture.

Indo-Pacific species of Terebra which have been collected in the eastern Pacific area are T. crenulata Linnaeus, T. maculata Linnaeus (The subspecies, T. maculata roosevelti is endemic of the Revellagagido Island, Mexico.), T. affinis Gray, T. laevigata Gray (syn: T. stylus Dall), T. paucistriata E. A. Smith, and T. turrita E. A. Smith. Two Atlantic species, T. dislocata ( Say ) and Hastula albula (Menke) are found living in the eastern Pacific area, the former being the more uncommon.

Three species of Terebra were named for San Diego Club members this year (Bratcher & Burch, 1970), T. dorothyae for Dorothy Brown, T. purdyae for Ruth Purdy, and T. stohleri for Dr. Rudolph Stohler. Other 1970 Bratcher & Burch species are T. allyni, T. brandi, T. hancocki, T. jacquelineae and T. shyana.

Colored slides of all species mentioned were shown in the program.

## BOOK NEWS

Jules Hertz

This writer is privileged to review, this month, the newly published book, LIVING VOLUTES - A Monograph of the Recent Volutidae of the World by Clifton S. Weaver and John E. duPont, Monograph Series No. 1, Delaware Museum of Natural History, 1970. This exceptionally fine book is sure to be considered a standard of excellence for all future writers in the field. This book has outstanding organization. Starting with a complete systematic arrangement of subfamilies and recent





genera in the family Volutidae, it then proceeds in detail through the descriptions of family, subfamilies, genera, subgenera, and species. The generous use of different sizes and forms of type makes it extremely easy to locate desired information. A typical description of a species is broken down into synonymy, type, type locality, range, habitat, dimensions, shell description, animal and radula, and remarks. The text is extremely thorough and well balanced, augmented by many plates and figures of the shells as well as the animals and their parts.

The book contains 79 color plates of exceptional quality generally showing both dorsal and ventral views of the many species and their various forms. A number of the color plates depict the live animals, and the beauty of the shells is overshadowed by the fantastic coloring of the animals. The figures are black and white drawings of radula, opercula and various animal parts. An occasional map is used to supplement the text.

The authors tend to "lump" rather than "split" species. Some examples of this are, (1) the lumping of *johnstonae* and *butleri* under the species *junonia*, (2) the placing of *depressa*, *jaculoides*, and *johnstoni* under the species *arabica*, and (3) the placing of *ruckeri*, *ceraunia* and *macgillivrayi* under the species *rutila norrisii*. Areas where sufficient information is presently lacking to lump certain species are carefully reviewed. The book has an excellent bibliography as well as a glossary of volute terms.

The LIVING VOLUTES is a must for all who specialize in the collection of volutes. It could be a most welcome addition to anyone's shell library. This writer is just kicking himself for not purchasing the LIVING VOLUTES at its initial offering price. For those who have yet to purchase the book, the present cost is \$55.00

#### OBSERVATIONS OF TYPHIS AT SAN FELIPE

By Joyce Gemmell

Since the first report of *Typhis coronatus* Broderip, 1833, collected here in San Felipe bay, in 1968, I have been keeping a monthly check on the small colony.

Possibly the uninviting area and the difficulty in seeing them in their natural habitat has been instrumental in the establishment of this rarely-found genus intertidally.

The small population under observation is found in a very restricted area of mud and cobbles at the edge of the extreme minus tide line. They have been found on stones, both bare and covered with marine growth. In more instances they are found close to the base of stones in muddy silt with only the siphons or tubes protruding.

The monthly check on the colony has shown at least one specimen every month there is a minus tide of four feet or more. The largest number of specimens counted were in the month of April during early morning minus tides when juveniles were found along with adults.



Observation of specimens in the aquarium has provided little information as this condition is so alien to their natural habitat. In the aquarium they move about very little and usually stay in the corners of the tank or against a rock. They bury themselves if there is very fine sand in the tank. When they are in motion, it is so slow as to be almost indeterminable except for abrupt changes in direction. The forward motion of the foot and shell do not seem to be parallel. The shell is off to the side on a slight angle and after the foot moves forward a quarter inch or so the shell is rotated around in the direction parallel to the foot.

Observation of the animal in the tank is difficult primarily because of their inactivity. The foot, viewed from the bottom seems rather small compared to the shell length. In viewing the animal from the side as it moves on a flat surface, the eyes and tentacles are difficult to see. The shell slants downward and protrudes beyond the leading edge of the foot. If the anterior end of the shell slides up an obstruction before the foot follows, one gets a view of the tentacles and eyes as if one pushed a hat back off the eyebrows. The tentacle ends are almost microscopic beyond the eyes and it has been virtually impossible to get the animal in any position to see if there is a mouth or proboscis.

In checking the distances between rocks across muddy flats and channels and the distances from low low water to the highest area they have been found, it seems the animal would spend several days moving from the exposed bottom to the low water line. In reviewing the natural area it might seem the semi-fluid condition of the upper layer of silt which they inhabit might facilitate a faster horizontal movement.

The possibility of some constructive observation of this genus in the field has been an impossible project for one person to undertake simply because of the difficulty in spotting the shell in the limited time of lowest water.

If any shell club members would be interested in cooperating in a project of marking all specimens found during the night time minus tides, from November to March, I would be more than happy to supply the marking material and explain the procedure. It would also entail a record of the shells marked and replaced along with a record of those taken for a collection.

The object of the marking being a population count in the spring of 1971 and a record of several other observations made at the time, which would be tallied in the spring also.

If you plan to be in San Felipe on any of the winter minus tides and would be interested in spending an hour or two commiserating with a fellow shell collector about all the rare Typhis you picked up and put back, I would be happy to see you.

(J.G. - Club De Pesca, San Felipe, Baja, Calif.)





Letter of thanks from Calif. Malacozoological Soc. for \$25. donation.

Overseas membership rate set at \$3.50. Surface mailing only.

Slate of nominees by Board for November election: President, Roland Taylor - Vice President, Clifton Martin - Corres. Sec'y, Virginia Hanselman - Recording Sec'y, Clifford Martin - Treas., Margaret Molliner.

Christmas party to be held at Miramar CPO Club, Dec. 11 (Fri.) Reservations taken at November meeting. Helen Thompson volunteered as Decorations Chairman. Willing helpers, please contact her.

Club voted \$35. to buy new books. One chosen is Olive Shells of the World by Zeigler and Porreca.

New members joining at meeting: Betsy Dyer, Lucinda Rubio, Susan and Martin Bishop.

Cookies for November - Emma West and Helen Thompson.

New Members	Dr. & Mrs. Martin Bishop (Susan)	Mrs. Betsy Dyer
	7432 Cabrillo	1707 Chalcedony
	La Jolla, Calif. 92037	San Diego, Calif. 92109
	Mrs. Hazelle B. Maquin	Mrs. Ouida White
	437 Douglas St.	2912 Garrison
	Salt Lake City, Utah 84102	San Diego, Calif.
	Dr. Takashi Okutani	Miss Lucinda Rubio
	632 Sea Lane	555 Naples - Apt. 912
	La Jolla, Calif. 92037	Chula Vista, Calif. 92011

Change of Address: Dr. & Mrs. Bertram Brown  
7090 Maderira St.  
Goleta, Calif. 93107



## SPIRULA SPIRULA

By Charles W. Johnson

The chambered shells of Spirula  
As they float upon the sea,  
Are cast on a thousand beaches  
For anyone to see:  
But the animal that made this shell  
Was long a mystery

Linne' called it Nautilus Spirula  
Which was not a very bad guess:  
Lamarck called it Spirula Peroni  
(though he'd first named it  
Fragilis)  
And thus, quite early, started  
A nomenclatorial mess.

Some said with that disk-like  
Sucker, attached, it must surely  
grow,  
While the rudimentary fins would  
prove  
As a swimmer, it must have been  
slow.  
Then - the chromatophores would  
indicate  
That it lived in the mud, you know.

'Twas the Dana Expedition  
That discovered Spirula's home -  
Far above the oozy bottom  
And below the great wave's comb:  
For bathypelagic is the Spirula  
And there's where it loves to roam.

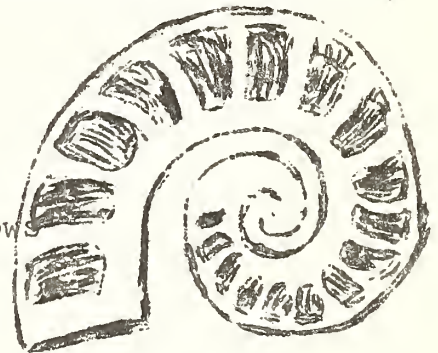
It only lives in warmer seas  
At more than a thousand feet,  
Suspended, head-down in the water -  
A position hard to beat.  
Doubtless, it is its chambered  
shell  
That aids it in this feat.

And now they say that the 'sucking  
disk'  
Is really a lamp instead -  
And perhaps its lighter color is  
due  
To its standing on its head!  
Can't rest in the ocean's bed.

Verses above contributed by Neil M. Hepler who gave permission to Emma West for their use. Drawings were made by John Souder from photos by Sheldon Dobkin of Florida Atlantic University and a detail sketch by Neil M. Hepler.



Drawing at top right shows  
shell cut to show  
chambers and siphuncle  
tube.



Drawing at bottom right  
shows complete shell







Compiled By Virginia Hanselman

The following are abbreviations, words, and phrases that you may come across in your search to identify shells or while perusing some of your shell literature:

- aff. (affinis) - affiliation, meaning that although not identical with name mentioned, it appears to be genetically related to it.
- auctt. (auctores) - of authors. Used to refer to a name which has been used by certain authors in a way that differs from the concept of the original author.
- ca. (circa) - about. used with time, meaning an approximation.
- cf. (confero) - similar to, to be compared with name mentioned.
- e.g. (exempli gratia) - for example.
- emend. - emendations. sometimes deliberate alteration in the spelling of a name.
- err. - error.
- ex - from.
- ex pisce - from fish (stomach thereof).
- fide - to entrust (to).
- ibid. (ibidem) - in the same place.
- ICZN - International Commission on Zoological Nomenclature.
- i.e. (id est) - that is
- in litt. (In litteris) - in letters.
- in statu nascendi - increasing in stature.  
i.e.: "...taxa on the treshold between subspecies and real species - they are species in statu nascendi".
- ipse - himself.  
i.e.: "This is the true V. nuttalli CONRAD, \*teste Conrad ipse." (\*see teste below)
- loc. cit. (locus citatus) - cited before in same discussion, passage quoted.
- M - type fixed by monotypy.
- MS. - manuscript (in the manuscript of).
- mut. - mutation.
- nom. conserv. (nomen conservatum) - names which would have to be rejected by application of the Rules of Nomenclature except for saving them in their original or an altered spelling by action of the ICZN.
- nom. correct. (nomen correctum) - a name with an intentionally altered spelling of the sort required or allowed under the ICZN rules.
- nom. dub. (nomen dubium) - name of a species for which insufficient information was given to enable recognition of that species. (perhaps not figured, no type named, etc.)
- nom. imperf. (nomen imperfectum) - a name which as originally published meets mandatory requirements but contains defects such as incorrect gender, incorrect stem, or form of ending of a family-group name.
- nom. inviol. (nomen inviolatum) - inviolate names, which as originally published meet all mandatory requirements and are not subject to any sort of alteration (most generic and subgeneric names).



- nom. negat. (nomen negatum) - a name that constitutes invalid original spelling and although possibly meeting all other mandatory Rules, is not correctable to establish original authorship and date. A "denied name".
- nom. nov. (nomen novem) - a new name.
- nom. nud. (nomen nudum) - a name with no meaning, compromised; not meeting requirements of the Rules, - not correctable. Has no stature in nomenclature.
- nom. null. (nomen nullum) - a spelling error.
- nom. oblit. (nomen oblitum) - an unrecorded name that has not been used by subsequent authors and therefore is rejected. (This idea was introduced by the ICZN several years ago but has not worked out well and has since been dropped.)
- nom. perf. (nomen perfectum) - a name which as it appears in original publication meets all requirements and needs no correction, but is legally alterable (as in changing the form of ending of a published class/order group name).
- nom. subst. (nomen substitutum) - a replacement name published to take the place of an invalid name (equivalent to a new name.)
- nom. transl. (nomen translatum) - a name derived by a valid correction of a previously published name because of a transfer from one taxonomic category to another within the group to which it belongs.  
i.e. Subfamily STYLININAE d'Orbigny, 1951  
(nom. transl. Edwards & Haime, 1857 (ex Stylinidae d'Orbigny, 1851)).
- non - not of
- non in situ - not in its natural place.
- nov. sp. (sometimes N.S.) new species (spp. - species (plural))
- OD - type species by original designation.
- op. cit. (opere citato) - in the work cited.  
(opus citatum) - the work cited.
- pars )  
partim) - in part
- pend. pending.
- pro - for
- SD - type species by subsequent designation (when type species of a genus is not determinable from the original genus publication).
- sic - Thus; exactly reproduces the original, including any misspelling or error.
- s.l. - (sensu lato) - in the broad sense.
- SM - subsequent monotypy (when a genus as first described includes no mentioned species and thus lacks a type species, at a later date, when one or more species are assigned to it, if there is only one species assigned at this time, that species becomes type species by subsequent monotypy).
- sp. - as used after a generic name without a specific name, means that the species is not determined.
- spec. nov. (species nova) - new species.
- s.s. (sensu stricto) - in the strict (narrow) sense.





teste - as witnessed by. (see ipse above)

var. - variety.

viz. (videlicet) - namely.

? question mark before a generic name - position questioned.  
before species name, -- uncertainty as to whether in  
that genus.

() parenthesis - if the author's name is in parentheses, it means  
that it is his species, but that the generic name has  
been changed from that in which he had placed it  
originally.

#### References:

Treatise on Invertebrate Paleontology (1) Mollusca 1

The Veliger, Vol. 8.

Webster's Unabridged Dictionary

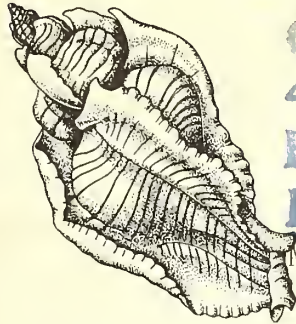
Volutes by Weaver & DuPont



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## SAN DIEGO SHELL CLUB

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Museum of Natural History - Third Thursday - 7:30 P.M.

President: Roland Taylor  
Vice President: Clifton Martin  
Recording Secretary: Clifford Martin  
Corresponding Secretary: Virginia Hanselman  
Treasurer: Margaret Mulliner  
Editor: Blanche Brewer

Vol. II

January 1971

No. 1

\*\*\*\*\*  
\* Program: \*  
\* Generic and Specific Names in Muricacea and Buccinacea: \*  
\* Dr. George Radwin \*  
\* Christmas Party Slides: Dave Mulliner \*  
\* Publication Address: \*  
\* Virginia Hanselman, 5818 Tulane St., San Diego, Ca. 92122 \*  
\*\*\*\*\*

### SHELL PERSONALITIES OF JAPAN

By Dr. Takeshi Okutani

(Note: -- Today's talk is neither a conventional malacological history of Japan nor an introduction on scientific activity in Japan's malacology, but only a free speech on personalities of some Japanese malacologists and collectors.)

Malacology or scientific and systematic collection of mollusks in Japan was initiated by Yoichiro HIRASE (1895-1925). He was not a scholar but his attitude to malacology was highly scientific in comparison to any naturalists prior to him. He devoted himself to not only his own malacological study but also to making shell collecting a public interest. Along this line, he established a conchological museum in Kyoto in 1913 and it was operated by his own wealth until it came to the end in 1919 because of financial difficulties. At the same time, he published a monthly conchological journal which contained a good number of malacological papers of a high level picture cards and other publications on shells. The journal unfortunately ceased publication only two years and four months after it started. His eldest son, Shintaro HIRASE followed in his father's footsteps. His book,



"A collection of Japanese shells with illustrations in natural color" (1934), which was revised and enlarged by Isao TAKI in 1951 and better known as HIRASE's book, made up an essential base of today's popularity of malacology in Japan. The HIRASEs had a very close contact with Henry PILSBRY who described many Japanese species and gave hirasei to so many species (e.g. Pleurotomaria hirasei, Japeliion hirasei, etc.). Cypraea hirasei was not described by PILSBRY, but the first specimen was discovered in a toy jewel box of HIRASE's daughter.

In 1901, HIRASE hired a man as curator of his huge collection. His name was Tokubei KURODA. He worked on the settlement of the remaining business after the collapse of HIRASE's museum and moved to the Geological Department, University of Kyoto. He was assigned as librarian of the department, but he was given, by HIRASE, a shell collection which was useful for his own reference specimens until it was lost by a fire in 1931. He then decided not to have his "private" collection and has long devoted himself to identifying the specimens brought in by many scholars and amateurs. He has not only a keen eye on molluscan specimens but also a deep knowledge on bibliographies in the fields of malacology, paleontology and geology. With his diligent and faithful application the library of the department became one of the most complete libraries in this field in Japan. In 1923, when the grand ceremony of accession for the Emperor HIROHITO was given, KURODA established the Malacological Society of Japan with 18 other malacologists and amateurs who were professors, school teachers, students, shrine priest, bonze etc. At the time of his 61st birthday, Akibumi TERAMACHI celebrated KURODA by presenting to him a shell collection which is now the base of KURODA's private collection. He claims that there is no other person who looked at more shells than he had for these 70 years. This is not the only reason why he knows the shell best in Japan. He has been always very faithful, careful and thoughtful in seeing even mean specimens. His broad bibliographical knowledge and sharp insight make his identification very reliable and authoritative. Recently, he has concentrated on completing a monograph on the shell collection of the Emperor.

Our Emperor has a broad interest in marine invertebrates. He seldom does beach collecting as he does not like to bother with a large personnel for guarding him. So that his collection is more or less offshore dredging stuff. The late Korokuro NAKAMIGAWA ever told us (he might be the only shell collector who could go to the sea with the Emperor) about the Emperor's enthusiasm in collecting shells. One of the attendants gave a warning to the Emperor that the sleeve of his white shirt would get muddy, as he rushed to examine the dredged materials brought aboard. The Emperor replied, "Who cares?".

Akibumi TERAMACHI, according to KURODA, is an unusual talent in collecting shells. He was born in Kyoto in 1898 primarily intended to be an artist. But he started to collect shells as he had always been interested in nature. He was once supported and guided by Ryosuke KAWAMURA, but later, his collection from Okinawa and "Tosa" yielded a remarkable contribution to the molluscan fauna of Japanese waters. There may be nobody like TERAMACHI whose name was given to so many spectacular, rare shells (e.g. Perotrochus teramachii, Cypraea

teramachii, Teramachia tibiaeformis etc.). He was a great influence to shell lovers around him. One of TERAMACHI's followers was Tetsuaki KIRA. He was primarily a priest, but he needed not to do any Buddhism service, as he succeeded only to the name and had no temple and no parishioners. He devoted his life mostly as a school teacher and school master. He made a magnificent effort to bestow favors on Japanese malacologists. For some time after the War, the publication of the "Venus", the Japanese Journal of Malacology, was not smoothly done because of economical and social reasons. KIRA then started to publish a mimeographed circular which later grew to be a mimeographed journal, "Yumehamaguri". He prepared the stencil paper by his own hand, he bound the hundreds of copies of the mimeographed journal by paper string and packed them to be mailed without having any help. It was ended by No. 100 at the time, when the "Venus" came back to its steady way. He also published a Japanese shell book in color, which is so famous as "KIRA's book", containing 1270 species. The shells shown in the book were all from his private collection and readers admired the completeness and cleanness of his collection. KURODA, KIRA and some other malacologists convened informal monthly meetings at Kyoto. There are many more professional malacologists and amateur collectors around Osaka Kyoto districts (e.g. M. AZUMA, H. KAJIYAMA, N. KIKUCHI, F. SUGITANI, Iwao TAKI, etc.).

As the post-War chaos passed, the chair of curator of Invertebrates, National Science Museum, Tokyo, was taken by Isao TAKI who was the notable chiton specialist. After his death in 1961, Tadashige HABE moved from Marine Biological Station, University of Kyushu. He spent his early days in KURODA's office at University of Kyoto. It seems to us that his primary interest was land snails before he entered the marine shell field. Upon the request of the publisher, he wrote another colored book of Japanese shells. This is known as "HABE's book" covering the species that were not contained in KIRA's book. Now both of them cover almost two-thirds of Japanese known species. He has several fellow scientists under his division, one of which is Sadao KOSUGE. He is now doing very scholarly work on anatomy and phylogeny of small-sized gastropods.

One of the biggest and finest collections in Japan may be Ryosuke KAWAMURA's. Kin'ichi SAKURAI, who is Ph. D. of mineralogy (and a restaurant master) was long followed after KAWAMURA. His collection is now in his private museum and one of the best curated (with up-to-date names) collections. Supposedly, it will be within the biggest five. Before he built the museum, his cabinets were behind the counter desk of restaurant master. Whenever I visited him, our "shell" conversation was interrupted by waitresses telling the guests' orders to him and then his yelling those items to the kitchen. Tokio SHIKAMA is a kind of rival of his. He is a notable paleontologist of quadroped animals. But, some time after the war, he abruptly became very aggressive in shell collecting and publishing malacological papers. His book "Selected Shells of the World in Natural Color. Vol. I" was completed with the very scholarly co-author, Masuoki HORIKOSHI. HORIKOSHI is a general marine biologist rather than a malacologist. He holds in his institution a huge collection of deep sea shells and seems very busy studying them. In the Tokyo district, there are more professional malcologists (K. OYAMA, etc.) and amateur collectors.



## RECOVERY - AND DIVIDENDS

By Nola Michel

A little over 26 years ago a Navy pilot had fuel trouble over water about 12 miles SW of Pt. Loma. He ditched his plane on the water. The WWII Grumman Hellcat sank and the pilot was rescued.

But that was not the end of the story. At our meeting in November we had Lockheed's chief deep submergence pilot, Larry Shumaker, as a guest speaker. He is Pilot on Lockheed's Deep Quest. On a dive in May 1970, 12 miles SW of Pt. Loma, in 3,400 ft. of water, Larry came across the plane. He said that it looked like the pilot had just landed there and gone for a cup of coffee. The plane was in remarkable condition. The canopy was clear - it looked as though you could climb in and fly it away. (It would be hard to believe how remarkably preserved the plane really was, if you had not seen the wonderful underwater pictures.)

On Oct. 8 1970, in a joint effort, the Navy's Deep Submergence Group and Lockheed Corporation recovered this aircraft as an exercise. It was a record-breaking and news-making feat. Larry told us of the trials of the recovery and the times they thought they'd lost it, with lines parting - but after a time it was winched up and placed on a sling. Soon after it was aboard the Dry Dock USS, White Sands.

Of course the most interesting thing to us shellers was what was living on - and in - the plane. Clinging to the underparts of the wings and other protected surfaces, were many transparent and fragile pectens, Deltopecten randolphi tillamookensis, Arnold. Found in the cockpit, was a Cancellaria crawfordiana, Dall. Flushed from the interior of the fuselage, was a Neptunea pribiloffensis, Dall. Clinging to the outer surfaces, were specimens of a Collus species, some very small Acmaea and a small Trophon avalonensis, Dall. Other interesting things were taken - a crinoid from the cockpit, anemones clinging to the fabric skin, a large crab from the inside of a wing. The pictures Larry showed us were very interesting. If you missed the program, you missed a good one!

## THE RADULA

George E. Radwin

No feature of significance in the taxonomy and identification of mollusks has confused and frustrated collectors as much as the radula. Few shell collectors deny its fundamental importance to molluscan feeding habits and relationships. Apparently, many people feel that the use of an internal, thus generally invisible structure in identification is unfair. Clearly, taxonomic decisions requiring examination of the radula are impossible to make for anyone but a trained scientist with a microscope. This division of labor is resented in some quarters because few people realize that the interpretation of the radula is at least as important as its mere extraction and mounting.

In the midst of this debate there is an understandable tendency for a structure never seen to lack reality. Thus a few shell collectors have informed me, perhaps in jest, that radulae are figments of certain scientists' overfertile imaginations. In an effort to squelch this unfortunate rumor I would like to explain the nature of this structure in some detail.

The radula is one of the few features that is characteristic of "all" mollusks. It is necessary, here, to immediately qualify "all", as most readers are aware that bivalves lack a well-defined head region and with this the radula has been lost. One of the only features to tie the Cephalopoda in with the mollusks is the possession of a radula.

What is a radula? The answer is elusive, as it varies from group to group. To generalize one would have to describe it as a flexible cartilaginous ribbon, bearing tough chitino-silicoid "teeth" on it. The shape, number and arrangement of these teeth varies widely within the mollusca. The radular ribbon is positioned over a stiff cartilaginous rod, the odontophore (odonto-tooth; phore-bearer). At the upper-rear end of the radula, special cells (odontoblasts or tooth bodies) continually produce new teeth, and below-rear the worn, chipped teeth are discarded. The entire belt, connected to the proboscis (pharynx) by a complex array of muscles, makes up the buccal mass. These muscles cause the radula to move, belt-like, over the odontophore. Over the outer tip of the odontophore, the pressure caused by the rigidity of this structure causes the teeth, previously lying flat on their ribbon to become erect. This relatively small section of erect radular teeth is positioned at the opening of the proboscis and is the functional portion of the radula.

The radula is a marvelously versatile organ. Its ability to adapt has enabled mollusks (particularly gastropods, the group in which the use of the radula is most prominent) to fill many different niches. Many primitive mollusks, such as the archaeogastropods and chitons, are grazers, whose radulae are suited to scraping algae from rocks or bits of sessile organisms such as sponges and ascidians from the surfaces of colonies. Some unusual gastropods are filter-feeders. These animals unfurl mucus "plankton nets" which, when full are hauled in, using the radula as a windlass. Some parasitic gastropods lack radulae. Most of these are ectoparasitic (outside parasites). Many gastropod groups are typical vegetarians. The Strombidae and most of the Cypraeidae feed in this way. Algae, generally the erect, branching or filamentous types are cropped by the radula in a manner reminiscent of a cow cropping grass.

A great many gastropods are carnivores (meat-eaters). This broadly inclusive terms does not suggest the variety of feeding patterns it encompasses. Certain superfamilies (Naticacea, Muricacea) feed in a predatory manner. Individual snails seek out living prey and use the radula, as well as the accessory boring organ (ABO), a secretory structure, to produce a hole in the shell of the prey (bivalve, gastropod, barnacle). The radula is the agent of physical scraping or rasping and the secretion of the ABO causes a chemical or physical deterioration of the shell matrix. In the Buccinacea, many groups feed on carrion (dead and decaying animals and, less frequently, plants). Others feed on living flesh. These appear to discharge a narcotizing



material and (as for example, when preying on a bivalve) thus causing the adductor muscles to relax, which in turn allows the valves to gape.

Within the cephalaspidean opisthobranchs, the Saccoglossa are gastropods with specialized single radular teeth that are well-adapted to pierce particular kinds of algal cells. These animals then drink the cell contents.

Perhaps the most fantastic adaptation of a radula, short of its complete & permanent loss, as in the Pyramidellidae and the Eulimidae, is found within the Toxoglossa. This name refers to the type of radula found in the group. Contrary to popular assumption, toxo- does not refer to the toxic or poisonous capabilities of many of these animals. The Greek root toxo- refers to "arrow". According to some authorities, the radula in the Conidae, Terebridae and Turridae, has been lost in the course of evolution. The dart-like (arrow-like) "teeth" found in many present day toxoglossan species may thus be the outcome of more recent evolution and may not be homologous to radular teeth in other groups. The manner in which these animals attack their prey is undoubtedly familiar to many of you. Recent work by Dr. Nybakken has shown that for each of the three types of prey in the Conidae (worms, Mollusks, and fish) a different tooth style is found. Thus Conus purpurascens, a confirmed fish-eater, has one sort of dart, C. imperialis, a mollusk-eater, has a second type of dart and C. californicus, a worm-eater, has a third type. The nature of the toxin is, by the way, also specialized for the prey, making the eaters of fish (vertebrates) more dangerous to man.

A complete treatment of radular types and corresponding feeding habits would be very long but this brief sample should suggest the enormous versatility of the radula.

Nigh unto fifty members attended our annual club Christmas party, held again in the Red Room at the C.P.O. Club at Miramar Naval Air Station, on Friday, December 11th.

The room was beautifully decorated. On the tables, among the traditional holiday decorations were glittering seashells and seafans, the special touch of Helen and Ivan Thompson.

After an enjoyable dinner, John Souder, as installing officer, briefly reviewed the beginning of our shell club. He called to our attention that the club would be celebrating its 10th Anniversary this coming year. (Another very good reason for a celebration). Several of the charter members of the club were present.

Honored were the retiring officers, Carole Hertz, President, Nola Michel, Vice-president, Barbara Myers, Recording Secretary, Barbara Good, Corresponding Secretary, and Margaret Mulliner, Treasurer, for their devoted efforts and accomplishments this past year. John Souder served as Mentor-parliamentarian this past year.

Officers for the coming year will be Roland Taylor, President, Clifton Martin, Vice-president, Clifford Martin, Recording Secretary, Virginia Hanselman, Corresponding Secretary, Margaret Mulliner, Treasurer. There were beautiful orchids of various hues for the ladies, boutennieres for the gentlemen.

Shells in holiday wrappings were claimed by each member and guest from under the Christmas tree. An unexpected and happy surprise for the evening were the little gift boxes for everyone, each containing a souvenir and a greeting from thoughtful Ed Roworth. The ladies looked lovely, the gentlemen handsome, and it was fun, as our parties always are. It was a happy beginning to the holiday season and the close of a successful and enjoyable year for the club.

## ONE TRIP DOWN THE GULF OF CALIFORNIA

By Helen Thompson

Foreword - The Gulf of California, The Sea of Cortez, has lured adventurers and pleasure seekers for many generations. Most often the Sea is calm with few waves and the gentlest of breakers but when a storm is in the making, it can become a place of danger and terror.

\* \* \* \* \*

One year, while we were vacationing in San Felipe, Mexico, we met a couple who had a large boat and became well enough acquainted to discuss plans for the coming year. I told them I had always wanted to go to San Luis Bay, way down below the Enchanted Islands and they said we would plan that trip for the next year.

We thought perhaps it was idle talk but the next year we had a letter from them saying they were ready to go to the Islands and asking us to go with them. We had just returned from a trip to Manzanillo and Mazatlan and were tired but after all the planning we didn't have the heart to say 'no'. So, we loaded the trailer with a week's supplies and things for a long boat trip - and went back to San Felipe with them.

They took their boat which was 55 feet long and we took our little boat. The next morning we were off for the Enchanted Islands. We had to stop and gas up at the Sulphur mines, so waited for them to catch up since their boat only made 15 knots. Our little boat was much faster making 30 knots or more. When finally we saw them coming we waved and went on to Puertocitos. They arrived an hour or so later and we stopped for the night. There was absolutely nothing there - except for a lonely coyote and maybe a few rabbits.

We put our sleeping bags on the sand and made a real good supper. Before we went to bed, we explored all around. Found an old wrecked airplane, lots of shells of all kinds on the beach. We left about 6:00 the next morning. We got a long way ahead of them and Ivan and I explored all the little islands that make up the group they call the Enchanted Islands. Some were rocky and covered with whale bones and dead shells. Others had sand places. One was just one big birds'



nest - thousands of pelicans, thousands of seagulls. Their nests were just on the ground and when we came near, they would fly at us like they were going to bite us. Some of the young pelicans were almost white, bigger than their mothers, all of them with their mouths open, waiting for food. The young, when quite small, have just a downy fuzz.

That evening we finally arrived at San Luis Bay. We moored the big boat and used our boat to take the supplies to the island where we stayed. Every day we had to move our sleeping bags because the tides were coming up higher each night. Our friends had a night club so we picked up large venus eburnea to use as ash trays. We had empty five gallon cans that had held gas and water and used these to store the many beach shells we picked up - semiclassis centiquadrata, pink and black murex, many bivalves, many things I have forgotten - it has been 20 years. We stayed four nights. The Mexican guide told us to be ready at 6:00, so we were up and ready to go. Everything went well till we got to the place where the Islands make the Gulf narrower - where the oncoming tide meets the outgoing tide - and the waves were high.

There was a large Mexican shrimp boat just starting through all those waves. It would be completely covered with water but seemed to come up after a while and go on. Then our friends started through and their boat was just large enough to go through the waves but soon I lost sight of it. Ivan started through and our boat was short enough to go over the waves but the wind was so strong it blew the water all over us. I said to Ivan, "we can't take any of this". As Ivan started to turn, our friends did likewise and we went back the 20 miles to San Luis Bay. After a consultation we decided to all stay the night on the big boat and lash all the empty cans to our boat. We made a cold supper of ham sandwiches, tomato juice and peaches, then bedded down to sleep. Mrs. M. slept on the first seat as she was shorter and the wheel didn't bother her. Her husband slept, or tried to, on the next seat, Ivan and I put our sleeping bags on each side of the engine and the guide slept across the back of the boat. All night long I could feel the water hitting me - I couldn't sleep and when I saw the light of the owner's cigarette, I asked him why he didn't go to sleep. He said he was afraid the anchor would break and we would drift on the rocks. When I asked what would happen if it did he said we would have to get in the little boat, start the engine and hold the big one off the rocks. But morning came and we got off again at 6:00. After an hour and a half or more we were back at the same place and I was petrified because I knew we were in for some rough seas. Just as we stopped to gas up we saw the other boat smoking. Ivan screamed to "get the fire extinguisher", and as we screamed they raised the hood or canopy over the engine and it was on fire. When they closed the canopy, the fire stopped - but the guide had jumped overboard and swam to our boat. In Ivan's haste to get to the other boat he killed the motor so he told the guide to grab the oar and row as fast as he could to the other boat about 7 feet from us. Then, Mrs. M. had jumped but had caught her leg in the outboard motor rack and was dangling there, screaming for her husband to jump. But he wouldn't. All our food and water - but for a small amount - was on the big boat. Ivan jumped on to the other boat and found that a broken spring allowed the gas to be pumped on the hot engine. No real damage was done.

By the time we got the other boat fixed the water was calm and we fished or trolled all the way to Puertocito. But when we got there Mrs. M. was all in so we got off and made camp. As it was still daylight we started looking for shells. Found black murex, close in, pinks as the tide receded. We gathered quite a few, made a fire, cooked them and removed the animals.

With morning we started for San Felipe. We got to the Sulphur mines as it was just beginning to get dark. Ivan told the others to keep on coming and we'd go on in and have dinner ready and a fire going - it was cold and windy. We waved goodby and started in. In a few minutes we could not even see the other boat. We didn't have any lights so we had to be in port before it was too dark. It was on the first load he took up hill to the trailer and started the fire and got things going for dinner. It would be a long wait because we were more than twice as fast getting to port. As it was, the guide let them get stuck on a sand bar. They had him get out and push the boat to loosen it. Mrs. M. grabbed a bottle of whiskey and downed it. By the time they got to San Felipe she was crying and moaning. Ivan got her up to the trailer with the first load and when I got her inside she just kept up that crying. "Don't cry, it's all over now" - "Leave me alone, I'll be alright."

They got the big boat moored, ours ashore, the last jeep load stowed, with warm food and fire, everything turned out O.K. The people who watched our trailer told us if we had not shown up by morning they were coming to look for us. The storm had blown down trees from El Centro all the way to San Felipe and they were afraid for us and our lives. But they did not know us. Before we would have left our boat, we would have taken all the gas, all the water and food and could have got back two at a time in our little boat. I have all the faith in the world in Ivan. He and I both respect the ocean and never take any chances. We always have two motors, food and water.

Coming back we saw whales and the porpoises were so cute, crossing over in front of us. The faster we went, the faster they went. At that time there were no names we could make out for the bays and coves - but it was fun and I'd do it again - but maybe by jeep - and go on to the Bay of Los Angeles. Anyone wanting to take that trip now will find many conveniences we did not have.

## BOOK NEWS

Jules Hertz

The Shell Club library has recently acquired the book Olive Shells of the World by Rowland F. Zeigler and Humbert C. Porreca. The title is somewhat of a misnomer since the book deals only with shells of the genus Oliva. It does not cover the other genera in the family Olividae such as the Olivella, Agaronia, and Ancilla.

The book is a compilation of available data accompanied by 61 color plates showing the species and forms of the Oliva of the world. The authors recognize 57 species and 101 forms. The text includes



sections on the characteristics of the Oliva, fossil Oliva, feeding habits, breeding habits, collecting techniques, cleaning techniques, and classification. Black and white plates accompany these sections. The shell descriptions are good and as a general compilation, the book is highly valuable to the amateur collector. To the more scientifically inclined, the book may be found wanting in the quantity of new information added to the scientific literature.

The most interesting sections of the book deal with the feeding and breeding habits of the Oliva. The work of Olsson and Crovo form the major part of the sections, and point out the great knowledge which can be obtained by an amateur (Mrs. L.E. Crovo) patiently and perceptively observing aquarium specimens.

The book, Olive Shells of the World, was printed in the United State of America by Rochester Polychrome Press, Inc. Rochester, N.Y. Copyrighted in 1969, the book initially sold for \$12.95.

### CYPRAEA JACKPOT!!!

By Norm Currin

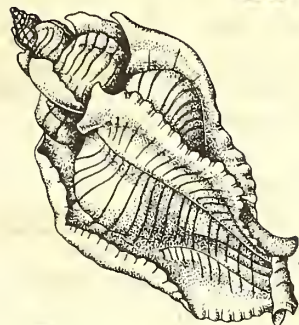
In March of 1970, along the coast south of Mazatlan, Sinaloa, Mexico, I hit what was for me the Cypraea jackpot of all my collecting days. While diving at 20 - 25 feet I overturned one rock and there on the underside were three Cypraea arabicula, two C. albuginosa, one C. cervinetta, and one C. isabella mexicana. Seven cypraea, representing four species - one a rare one! This was for me the greatest single-rock find of my shelling career. And as if this wasn't a sufficiently heady diet for one day, under the next rock - frosting on my cake I guess - I found three more C. albuginosa and another C. isabella-mexicana!

THE

# FESTIVUS

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### NOTES ON GENERIC NAMES AND PLACEMENT IN THE MURICACEA AND BUCEINACEA

By Dr. George Radwin

One of the unexpected benefits of arriving on the West Coast completely unfamiliar with the fauna of the region has been the opportunity to develop an understanding of specific and generic relationships with out any preconceptions. It can easily be seen that the choice of taxonomic characters will influence the relationships one sees, or thinks one sees. Although no unequivocal conclusions can be reached on the basis of one or two characters, in the absence of detailed anatomical, ecological and embryological information, comparison of the shell and radula of Panamic species with type species of genera of potential assignment has provided new and perhaps more accurate insights into these relationships. Several examples follow.

Three panamic species traditionally placed in Acanthina, A. tuberculata, A. muricata and A. grandis appear, largely on the radular evidence, to be quite unrelated to Acanthina (type species: Buccinum monodon), as all species correctly assigned to Acanthina have strikingly Thais-like radular dentition. The subgenus Acanthina (Neorapana) Cooke, however, was introduced for these three Panamic species. Their



radular dentitions are simple and very unlike any true thaisid radular dentition. In each transverse radular row there is a single, hook-shaped lateral tooth on each side of a flat, simple, tricuspid rachidian plate. This type of dentition and many aspects of the shell most closely resemble the Old World genus Rapana (type species: R. bezoar). We feel, therefore, that these three species probably belong, at least, in the muricid subfamily Rapaninae, and perhaps in the genus Rapana.

Another genus into which several eastern Pacific species have been placed, perhaps wrongly, is Caducifer (type species: C. truncata). This group, originally proposed as cymatiid, is now generally considered to be buccinid. I have been unable to obtain live-collected material and have thus not been able to verify this placement. Regardless of the outcome of this question it is more likely that such species as "Caducifer" tabogensis, C. nigrocostata (C. thaleia) and "C" cinis belong in one of two lesser-known genera, Monostiolium Dall (type: M. swifti) or Prodotia Dall (type: Pisania billheusti). I lean toward the former group, as "Caducifer" tabogensis is almost certainly an eastern Pacific counterpart of M. swifti. Unfortunately, the radula of C. tabogensis is not known and thus can not be compared with that of M. swifti.

This last group of species shows a gradient of shell form from tabogensis to nigrocostata to bilirata, a species seemingly closest to Pisania. My feeling is that this group of tropical buccinids may have been too finely generically subdivided.

Cantharus, (type species: C. tranquebaricus) has become a dumping ground for many tropical buccinid species not readily placed elsewhere. Species correctly placed here seem to grade from forms with short, stout shells and brightly colored parietal calluses (e.g. C. sanguinolentus) - to those with moderately large shells and yellow or orange apertures - to those with varicose and denticulate apertural lips (C. undata) - to large-shelled forms with broadly open apertures (e.g. C. elegans). Other more distantly related species such as C. macrospira and C. capitaneus have been also placed in Cantharus or C. (Hanetia). As Emerson (1968) has shown, the type species of Hanetia (Murex haneti) is a muricid, probably belonging in or near Urosalpinx. Dall erected the buccinid genus Solenosteira for these and other similar species. This, however, presents us with a philosophical problem. If Solenosteira is to be accepted, why not recognize the group of C. panamicus, C. pagodas and C. fusiformis. We are thus faced, as before, with the decision of either placing the various species into numerous groups largely on the basis of small but constant differences, or lumping them all in the single, all-inclusive genus Cantharus, uniting easily separable groups on the basis that these differences are of minor significance. I prefer the first alternative but feel that much work is needed before any significant subdividing is done.

It is true that the more familiar a systematist is with a group, the more likely he is to divide it finely. This is often justified by the specialist's familiarity with the group. A case in point is my experience with the Columbellidae.

The use of Pyrene for the group of Panamic columbellid species

including fuscata, major, aureomexicana etc. is, I believe, incorrect. Pyrene includes only 7-9 members and is limited to Indo Pacific region. Its type species, P. punctata, superficially resembles such eastern Pacific species as Columbella fuscata. In the Columbellidae, a major dichotomy may be made on the basis of the radular dentition with Columbella on one side and Pyrene on the other. In my dissertation, which I am readying for eventual publication this radular division is the primary basis for my proposed subfamilial revision with the establishment of the Columbellinae for the former group and Pyreninae for the latter one. A far simpler discrimination may be made. In Columbella the upper spire is unexceptional. In Pyrene, however, a remarkable development of the shoulder portion of the earliest 4-6 whorls imparts an exotic pagoda-like appearance to the spire when magnified.

Traditionally, West Coast workers have referred two species, with predominantly New World affinities to Hindsia, primarily an Indo-Pacific genus. Dell (1967) arrived at the conclusion that Hindsia can, at present, only be used for its type species, Neptunea pusilla. Other Indo-Pacific species previously placed in Hindsia, he places in Benthindsia Iredale (type: B. problematica) a group quite different from any New World form. As explained by Vokes (1969), species such as "Hindsia" perideris and "H" acapulcana should be placed in Trajana Gardner (type: T. pyta). Based on a fossil species, Trajana is limited to the New World and appears to be nassarid or nassaroid.

Colubraria, (type: C. maculosa) has never been satisfactorily familially placed. To this end I have searched for a radula in more than a dozen specimens of several species of Colubraria with no positive results. Although virtually impossible to prove, I am personally convinced that there is no radula in Colubraria ss. According to Dr. Ponder, an Australian colleague of mine, Dr. Habe (in letters to Ponder) has noted that he, too, has failed to find a radula from any member of the genus. Ponder (1968) has figured the radulae of two colubrariid species in the genera Ratifusus and Iredalula. These are definitely buccinoid and are, by his own admission, apparently vestigial. At present, this evidence adds up to a weak and purely circumstantial case for buccinoid placement of Colubraria. The functional significance of the lack of the radula in this group is not known.

(Dr. Radwin's presentation was very interesting, each example being accompanied by a slide. We appreciate the privilege of printing his scholarly text - backed by many, many hours of laboratory work. Ed.)

Mr. David Mulliner pleased all of us with his slides. Those of the Christmas party - some candid camera, some informally posed - were proof that everyone enjoyed the occasion. The colors were lucious, even marvelous. Prints will be treasured for years.

An extra bonus was the group of slides featuring some lovely nudibranchs, Dave's particular interest. His wonderful camera and ever-increasing artistry showed these delicate creatures in all their beauty. (He had some of them "in the flesh" in plastic bowls for close viewing.)



## IN MEMORIAM

Dr. Edwin C. Allison died January 8, 1971. "Ned", a professor of geology at San Diego State, was a former member of the San Diego Shell Club. He was making a study of geological formations in the Mexican desert, 60 miles west of Caborca, Sonora when he suffered an apparent heart attack.

A Paleontological Laboratory will be established in the name of Dr. Allison in the new State College Library. The laboratory will be built around his personal collection of fossil remains.

## THUMBNAIL SKETCHES OF OUR NEW OFFICERS

By Dave Mulliner

Roland Taylor is President of the San Diego Shell Club for 1971. He and his wife, Kay, started shell collecting about five years ago. They began, - as most collectors do - by picking up beach shells because they had interesting shapes or were pretty.

While in Manzanillo, Mexico, the Taylors met Laura and Carl Shy who whetted their interest in scientific collecting. They have since collected along the Baja Peninsula, the west coast of Mexico - where they lived for several years - and in Florida. They are building a world-wide shell collection and world-wide friends by trading shells taken on collecting trips.

Clifton and Clifford Martin, twin brothers, are both new officers. Clifton is Vice-president, Clifford, Recording Secretary. While still in high school in the Imperial Valley, they started collecting fossils. When they left the Valley, they donated their collection to the local high school. During WW II Clifford did some shell collecting in Japan. They have collected fossils in San Diego County and have an excellent fossil collection. Their shell collection is world-wide. They trade shells taken here and in Mexico to collectors from other parts of the world. Their shell collection and shell library take up a whole room in their house. The large size and beauty of the displayed shells makes their collection an eye-inspiring sight.

Virginia Hanselman is Corresponding Secretary. She and her husband, George, became interested in shells while George was stationed in Okinawa. Bernice Albert helped them with latin names, proper identification and methods of cleaning. Virginia, George and a few others on the island started the Shell Club there. In 1963 the Hanselmans moved to San Diego - and joined our Shell Club. George has become a well-known expert in Chitons. They have a world-wide collection and have personally collected in California, Florida, Texas, Mexico and British Columbia.

Margaret Mulliner is serving as Treasurer for a second term. A thumbnail sketch on Margaret was printed in the January, 1970 issue - the first - of the Festivus.

## SEARCHING FOR LOBIGER IN THE CAULERPA

By Norm Currin

A mossy green alga of the genus Caulerpa may be found on intertidal rocks and ledges along the Mexican Sinaloa coast. It has bright green leaves and tufted stems and forms an inch-deep solid green blanket carpeting the sides and tops of some of the low-tide rocks. On this caulerpan growth a bizarre mollusc may be found --- green as the alga on which it lives, and equipped with four wing-like appendages which have been described as modified parapodia. The parapodia resemble aelid-type cerrata but are non-functional except possibly to assist in locomotion. On its dorsum it carries a small bubble-like shell perhaps one quarter the length of the animal. The largest specimen I have seen was less than an inch long, with a shell slightly over a quarter inch. This strange creature is a Lobiger sp., a shelled epistobranch, and has only recently been found on the Pacific coast, although Lobiger serradifalci GONOR, 1961, is known from the Mediterranean.

My knowledge of this unusual animal came about through my association with Gale Sphon of the Los Angeles County Museum. We were on a collecting trip in January 1970 and he had high hopes that we might find Lobiger specimens among the Caulerpa which thrives south of Mazatlan. We went to the San Blas area and commenced our search. Gale found several specimens right away but it wasn't until the second day that I found one --- so well camouflaged that it could be easily overlooked.

The animal is best preserved in alcohol, if it doesn't throw off its parapodia as some of them do when disturbed. On a later trip in March I took a beautiful specimen, preserved it for a month in alcohol until I felt certain its meaty parts had "set", then placed it on a dish to dry out. When I looked a few hours later the animal had shrunk up to practically nothing. I later found out the cells are mostly water so it apparently had just evaporated.

The Mexican Lobiger is evidently a somewhat rare species. And it is so perfectly camouflaged in the branches of the green Caulerpa that it can easily pass detection by even a sharp-eyed collector. The beauty of the mollusc lies in the animal itself, with its green coloration and many fluttering appendages; the Haminoea-type shell, transparent and colorless, is in itself quite insignificant. There is no way to preserve the animal's natural color, for in preservative it quickly turns to dull brown. Perhaps, as with the multi-hued nudibranchs, this post-mortem inability to retain form and color is all for the best. If they could be preserved naturally, they would make such interesting additions to collections that intemperate shellers might hunt them to extinction.



## ABOUT THE CHACES

By Virginia Hanselman

Friends of Emery and Elsie Chace will be happy to know that they are looking fine, are as interested in shells as ever, and are still attending the meetings of the Conchological Club in Los Angeles. We had a very pleasant visit with them in their home in Lomita last month.

It is of interest to know that Mrs. Chace was among the twelve ladies who made up the early Conchological Study Club of Southern California, then led by Mrs. Ida Oldroyd, and which group eventually developed into the Conchological Club of Southern California. Mr. Chace was among the first three men who were admitted to the study group once the bars were down and men were admitted.

Likewise, the Chaces were charter members of our San Diego Club and were very active in it until they left San Diego. Their interest in shells began in 1910 and they met and were friends with many people who are just impressive names to most of us. Mrs. Chace mentioned that when they visited the Natural History Museum here on a trip to San Diego in 1914, it was then just an upstairs room in a business building down town.

In 1954, the Chaces became curators of the department of malacology in the present Museum of Natural History. After three years, Mrs. Chace officially retired, but they continued to work together with great enthusiasm and were always available to any of us for help or any encouragement they could give us. No club meeting or gathering seemed complete without them, and we still miss them.

Ruth French, their daughter, whose home is next door to theirs, tells us that Mr. Chace is writing an addition to his "Reminiscences", which was published in conjunction with the San Diego Museum of Natural History on his retirement from the museum in 1967. Some of the Chaces' personal collection had been given to our museum before they left here; some is now going to the Santa Barbara Museum of Natural History and Mrs. Chace said that some is also being packed to be sent to the Bowers Museum at Santa Ana.

One could not help but be impressed by the large stack of notebooks covering many, many years of collecting, from Vancouver, British Columbia down into Mexico, and this in the days when collecting meant really roughing it. Their notes were carefully made each day and with such accuracy and detail as to weather, tides, and conditions, that these notebooks are being preserved for the information they impart. They can be particularly useful now for a comparison on which the change of our ecology can be based. They may one day be of help in rebuilding something of what we have lost in nature.

How many shells they themselves have described I do not know, for they have always felt they did more by getting material into the hands of more highly trained workers and by sharing what they had learned with younger and beginning students. However, ten shells bear their name, and these by authors Berry, Strong, Henderson, Hertlein & Strong, Pilsbry, Bartsch, Dall, and Willett.

We were delighted to hear that Emery and Elsie Chace celebrated their 65th wedding anniversary in April of this year! Mr. Chace told us, with eyes twinkling, that he is still riding his bicycle. Our visit with them was much too short, and we left carrying plants from their gardens (they are all enthusiastic gardeners) and avacados from their beautiful big trees. It was such a pleasure to have been with them again.

## BOOK NEWS

By Jules Hertz

Another recent acquisition of the Shell Club library is "West American Mollusks of the Genus Conus-II," by G. Dallas Hanna. This soft covered book was published by the California Academy of Sciences in January 1963. It is an updated version of a previous paper by Hanna & Strong published in 1949. This revised paper has eleven colored plates. It is of particular interest to local collectors because it covers shells from a collecting area which, at least in part, is readily accessible to San Diegans.

The author has done an admirable job of distinguishing between closely related Conus species although he readily admits that many of the named species might be merely varietal forms. The book contains exceptionally fine descriptions and the color plates are extremely helpful in identification, although in some complexes like the regularis-gradatus-scalaris-recurvus complex the differences pictured between individuals of the same "species" are often greater than pictured individuals from the so-called different species. This book is a very valuable addition to our Shell Club library.

## AQUARIUM OBSERVATIONS

By Carole M. Hertz

At the Bay during low tide, we collected some specimens for our aquarium, among them a Solen rosaceus Carpenter. We later regretted it when we observed the poor animal attempting to "dig in". It tried repeatedly without success. Suddenly it propelled itself across the tank like a missile, ricocheted off the opposite side and "swam" back to the first side where it continued to try to bury itself.

The following morning we noted it being eaten by the Bursa Californica.

## OBSERVATIONS

By Jules Hertz

On December 1, 1970 we collected a growth series of Conus regularis Sowerby, 1833 at San Carlos Bay, Guaymas, Mexico. The cones were found in about one foot of water near the sand flats. While cleaning the bodies from these shells, we noted what appeared to be an



inverse relationship between the size of the operculums and the size of the shells. The smaller the shell, the larger the operc. In the two largest shells we could find no opercs, no matter how long we searched. Has anyone else noted anything of this nature?

### DETERGENTS HELP STARFISH CLEAN UP MOLLUSCS

An unexpected behavioral side effect of the use of detergents in mopping up oil spills is the suppression of the avoidance response that some molluscs exhibit when approached by starfishes. The stimulation for these escape responses has long been known to be chemical. Recent experiments have tested the effectiveness of chromatographically separated starfish extract on the common whelk, Buccinum undatum, and several steroid glycosides with surface-active properties have been found responsible for almost all the stimulating effect. It now appears that sub-lethal doses of commercial detergent destroy this sensitivity. A. M. Mackie of the NERC Fisheries Biochemical Research Unit at Edinburgh has found that exposure of the common whelk to detergent concentrations as low as 5 micro-grams per liter of water (under a hundred-millionth of an ounce per gallon) eliminates response to starfish glycosides for several days. This finding suggests that molluscs in "cleaned" coastal areas may be abnormally vulnerable to starfish attack, and, more generally, that detergent and other chemical pollutants can insidiously upset natural relationships in the coastal seas. From "Sea Secrets" Nov.-Dec. 1970.

### MINI MINUTES

Dr. Radwin's address and showing of slides by Dave Mulliner previously noted. Jules Hertz reported several additions to library. Nola Michel and Carole Hertz - cookies. Feb.

#### NEW MEMBERS

Jody Woolsey  
1543 Armacost St., Apt. 5  
Los Angeles, Calif. 90025

Mrs. Forrest Poorman  
160 Sequoia Dr.  
Pasadena, Calif. 91105

Virginia Lill  
9320 Earl St., Apt. 40  
La Mesa, Calif. 92041

Dr. Takashi Okutani  
Tokai-Regional Fisheries Research  
5-5, Kachidoki, Chuo-Ku Lab.  
Tokyo, Japan

Mr. and Mrs. Cliff Zerull (Rita)  
730 Eastburg Dr.  
Escondido, Calif. 92025

#### NOTICE!!!

To Corresponding Members: You must have dues paid by March 15, 1971 to receive April issue of Festivus. Send remittance to Mrs. Margaret Mulliner, 5283 Vickie Dr., San Diego, Calif. 92109-payable to San Diego Shell Club, Inc.

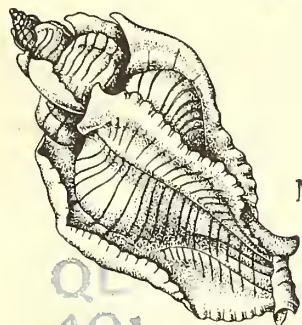
Also: Won't you please submit any items of interest (to your smelly feller shellers)? This is now your publication!





# THE FESTIVUS

THE



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## SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968

Museum of Natural History - third Thursday - 7:30 P.M.

President: Roland Taylor  
Vice President: Clifton Martin  
Recording Secretary: Clifford Martin  
Corresponding Secretary: Virginia Hanselman  
Treasurer: Margaret Mulliner  
Editor: Blanche Brewer

Vol. II

March 1971

No. 3

\*\*\*\*\*  
\* Program, March 18: \*  
\* Fluorescence in Shells - Susan Bishop \*  
\* Special Notice: \*  
\* All annual dues must be paid by March 15, for your name to be \*  
\* included on the 1971 roster, hence on the Festivus mailing list.\*  
\* Remittance payable to San Diego Shell Club, Inc., sent to \*  
\* Margaret Mulliner, 5283 Vickie Dr., San Diego, Calif. 92109 \*  
\* (Dues schedule, last page). \*  
\* ALSO: \*  
\* Donations of shells for the May Auction should be made very soon\*  
\* in order to be properly packaged and catalogued. They may be \*  
\* turned in to any board member or brought to March meeting. \*  
\* Preference, quality, rather than quantity - complete data, \*  
\* Please! \*  
\*\*\*\*\*

### NOTES ON A MEXICAN SHELL COLLECTING TRIP

By Norm Currin

Collectors: Bill Woods  
Norm Currin

Peanuts (Norm's dog -- not much good at collecting but a great guardian of our equipment while we dived.)

Transportation: Bill's 1965 Chevelle with back seat replaced by plywood compartments containing a six weeks' supply of canned and packaged food; atop the car was secured a large box containing diving and camping gear; the trunk was loaded with miscellaneous gear and equipment, including two sets of tanks for scuba diving, and an 18-inch hand dredge.

Shelter: A 6 by 8 foot Coleman Olympic tent --- simple to erect but barely adequate in size for two men and a dog.



Areas Collected: Down the Mexican West Coast from Altata to Mazatlan, to Novillero, to Puerto Vallarta, to Manzanillo, - thence, back up to Metanchen (San Blas) and Guaymas.

Departed: Sunday Nov. 29, 1970, at 5:30 A.M. Crossed the border at Caléxico. Drove until just after dark, stopping two miles south of Santa Ana, Sonora, to camp. Set up our tent 150 feet in from the road and had just finished dinner when out of the black night a train bearing down on us revealed that we were camped a few feet from a railroad track! Momentary feelings of panic, believe me.

Wasted Effort: Next day drove west from Obregon, Sonora, to investigate shelling at Huivulai and Playa Guadalupe. Neither worth the trouble.

Altata, Sinaloa: Dec. 1 and 2. Long expanses of sandy beaches with some muddy areas. Collected Nassarius luteostoma, Modulus cate-nulatus, Eupleura muriciformis, Natica chemnitzii, Olivella, and assorted bivalves.

Mazatlan, Sinaloa: Dec. 3. Scuba dived off Lighthouse Point. As we started down to dive a group of workmen set off a series of dynamite blasts among the rocks, one huge chunk of granite just missing Bill. Dived for 45 minutes. I took one Aspella myrakeenae, an attractive orange Clathrodrillia sp., and a large live Malea ringens which was knocked out of my hand by a huge wave as I climbed out of the water. I searched for fifteen minutes but could find no trace of it. Then as Bill came out he lost a flipper, and we were kept from the area for an hour while they blasted. When we finally got back into the water it took half an hour of searching to find it. Got air for our tanks at AGA Mex on Zaragosa Street.

Novillero, Nayarit: Dec. 4 and 5. We took the car across a strange little cable-guided ferry to reach this spot. Not much in live shells here, but lots of dead stuff scattered along the beach --- most of it bivalves. No diving here as the water was rough and dirty. Miles and miles of beach, north and south.

Puerto Vallarta, Jalisco: Dec. 6-15. Camped and dived and shore collected at numerous places in this vicinity, up and down the coast from P.V. Found the water cool enough to warrant wearing wet suit jacket and hood. Most of our collecting here was by diving --- skin and scuba. My greatest find was a live-taken Typhis (Cinclidotyphis) myrae, Du Shane 1969 --- the first live specimen ever found. Also took several Cypraea isabella-mexicana. Found Cypraea cervinetta, albuginosa, arabacula, Trivia radians, sanguinolenta, pacifica, Jennaria pustulata; took three beautiful hairy Cymatium vestitum, and several unusually large Cymatium gibbosum. Also large Bursa caelata. Found Malea ringens intertidally. Took Persicula phrygia and imbri-cata. Typhis fayae; Aspella obeliscus, erosa, and pyramidalis; a large Trigonostoma breve; several species of Engina; many different species of small to minute shells (Mangelia, Clathurella, etc.) which I have not yet identified; found two striking orange-striped specimens of Astraea olivacea; and of course a choice specimen or two of many of the shells more common to this area. Our days were devoted almost entirely to shells. Up at dawn to walk the shore; then a day of diving --- sometimes eight hours in the water; next a hasty dinner, after which we would look over each others takings for the day; then the evening would be devoted to cleaning and putting away shells. One day a herd of whales moved in on our collecting area just after we left the water. At Sayulita the natives staged a religious celebration one night and fired off fireworks and rockets hourly, keeping us awake and my pooch in a state of panic all night long. My overall opinion of

this area for collectors is that it's great if you dive but doesn't offer much if you don't, although we found a few choice things along the shorelines at low tide. We spent a total of eleven days here before moving on south. In Bill's car we didn't dare try the coast road so we spent a night in Guadalajara enroute Cuastecomate.

Bahia Cuastecomate, Jalisco: Dec. 16 to 23. Set up our tent under a palm thatched palapa roof on the Hotel El Dorado beach. For 20 pesos we had water, electricity, and bathroom privileges. Our collecting here was exclusively skin and scuba diving. As no air was available I developed a system I call "Combination diving" and found it to be an effective means of stretching your air. Basically, it consisted of skindiving while swimming and turning rocks, using the snorkel for breathing. Then if a turned rock looked interesting I would pop the regulator mouthpiece into my mouth and breathe from the tanks while I looked for shells beneath the rock, then to the surface to replace the regulator with the snorkel and to continue skinning. It may sound complicated but it actually was very effective and certainly stretched my air supply. It wouldn't be practical in deep water, but up to fifteen feet I recommend it.

Our collecting here produced a Conus diadema by me and a Conus vittatus by Bill. We each found a Lyria barnesi. I found a beautiful Aspella myrakeenae and a pair of Anachis adelinae, also a pair of large Typhis fayae. We collected several species of Calliostoma, many kinds of Anachis and Crassispira, tiny adult specimens of Columbella haemastoma and the equal-sized Columbella lucasana, and many different species of small things. We also took side trips to Tenecatita (found a pair of pure white Typhis fayae) and to Malaque (which seems to be always quite rough). We each took several Muricopsis jaliscoensis in this area, as well as Phyllocoma scalariformis, and I found a good crab specimen of Murexiella lapa.

Manzanillo, Colima: Dec. 24 to 26. We moved on down south of Punta Santiago and set up our tent in a space at the Sunset Gardens Trailer Park. My wet suit was badly torn and I had neglected to pack a can of rubber repair cement. Fortunately we were able to contact Laura and Carl Shy and they had a can, so repairs were made and I could go back to wearing my suit --- diving without it was awfully cold. We felt sort of lonely and out of it on Christmas Eve until a gorgeous little blonde came swinging through the camp and invited us to a party at her trailer. It was a great party and late that night after I returned to camp and was laboriously trying to tie the chitons I had collected that afternoon, good old Bill took over for me and I repaired to my sleeping bag, happy because it WAS a good party and it WAS good of Bill to tie my chitons when I couldn't even see them. Most of Christmas Day we spent in the water, collecting some nice Muricantha oxyacantha, Morum tubercularum, Trivia pacifica, and numerous species of Anachis, Mitrella, Crassispira, and Aspella. The day before, as I left the beach, I had turned a small chunk of dead coral well up on the beach --- beneath it was a beautiful rich dark Cypraea cervinetta. On my return to the beach the first thing I did was to turn the same chunk of coral --- an identical Cypraea cervinetta was under it! We tried to get air for our tanks in Manzanillo but were not successful. I talked with the Commandante at the naval station there and he assured me that he would gladly fill my tanks but their compressor was in Acapulco and nothing else is available south of Puerto Vallarta. The day after Christmas we headed back to Guadalajara, on to Puerto Vallarta for two days, and then up to Santa Cruz.



Santa Cruz, Nayarit: Dec. 29. Had a poor tide this day so our only hope for collecting lay in skindiving. The water was very rough and murky and the rocks literally covered with long-spined sea urchins. I got out beyond the surf line without getting pin-cushioned, then found the water so dirty it was impossible to shell. Spent half an hour and could see nothing, so I headed back in --- again miraculously avoiding the urchins --- and we gave up and headed north for the San Blas area.

Matanchen, Nayarit: Dec. 29 to Jan. 2, 1971. Registered at the Hotel --- running cold water (runs in-but drains out very slowly) and - we were to find out - rats! Low tide at sunset, so we headed for the beach with our buckets. As I followed the tide down I found good color varieties of Oliva undatella, Olivella morrisoni, Olivella zonalis, Pitar lupinaria, P. alternatus, P. roseus, Donax transversus, Terebra variegata, T. armillata, and crab specimens of Cominella subrostrata. Then at maximum low tide a small sand spit was uncovered for just a few seconds --- just long enough for a few choice bivalves to pop up out of the sand and into my bucket. In that brief interval I picked up three three-inch Adrana sp., a large Mactrellona exoleta, and a Tellina purpurea! Next day I got several Agaronia testacea, Turritella leucostoma, Hastula luctuosa, a beautiful brown and white striped Eupleura muriciformis, Trachicardium procerum, and (new to me) a pair of Northia northiae. Next day we rented a small rowboat to try out our dredge. No oarlocks so we had to paddle --- and you can't pull a dredge by paddling, we found out. A mooring post in the middle of the bay solved our problem. We simply dropped the dredge a hundred feet from the post then paddled to the post while playing out the dredge. It worked, and by radiating out in all directions from the post we were able to pretty well cover the ocean floor for a hundred foot radius. We took Dentalium sp. galore, Bifurcium bicanaliculatum, Epitonium, Agaronia testacea, Olivella, Ruthia mazatlanica, Terebra, Olivella, and Anachis. Then we found our boat to be good collecting grounds, for crawling around in the bilgewater were four species of tiny Anachis, several of Mitrella, and several other tiny shells which we have not yet identified. We assume these shells came from the fish nets which had been in the boat when we rented it. We were bothered by rats in our hotel room, chewing through the plastic container into P Peanut's dogfood. Then New Years morning, after the quietest New Years Eve I've ever experienced, we were awakened to a splashing sound coming from the bathroom. I got my flashlight and found a large rat jumping around inside the toilet bowl. It was too big to flush down the drain, and besides, that seemed sort of cruel for it looked like a nice healthy clean jungle rat. Since I had some bad cuts on my hands and hence a good excuse, Bill had to don his heaviest glove and go after the animal. The rat made no attempt to bite, and Bill released it outside where it spent several minutes regaining its composure before it disappeared --- either into the jungle or back to someone else's room.

Guaymas, Sonora: Jan. 2 to 4. Arrived right in the middle of a cold spell --- down to 39 the first night, 35 the second. That's cold for Guaymas, and for us San Diegans. A wild windstorm struck at midnight, collapsing trailer awnings and scattering lawn furniture --- our tent held fast, tho I feared for a while it wouldn't. It was much too cold for diving so we just walked the beaches, even though the tides were very poor. And despite the bad tides we did quite well with our collecting. Got Modulus catenulatus, M. disculus, M. cerodes

(crab), Morula ferruginosa, Fusinus ambustus, Knefastia olivacea, Eupleura muriciformis, Agaronia testacea, Columbella aureomexicana, Strombina maculosa, Anachis coronata, Conus ximines, C. Ximines mahogoni, Oliva spicata, Melongena patula, Polinices bifasciatus, P. uber, a very large P. reclusianus, we each took a live Sinum debile (which has an operculum that is very difficult to find), Strombus gracilior, Pecten vogdesi, and while Bill found Conus virgatus and C. regularis, I found a Cassis centiquadrata and a large Laevicardium elatum. For dinner on the fourth we ate our last can of staples, our car insurance ran out on the fifth, and the cold was getting to us; so we decided to head for home. We had tried to keep our tent warm by leaving a light bulb on inside a tin can --- it had helped I'm sure, but a warm dog inside my sleeping bag had helped more. The motel book for Mexico had promised us heat at our motel in Santa Ana, but there was none and it was colder than at Guaymas. Next day we crossed the border into Calexico. The border guards said it was too cold to check our gear so we zipped right through --- I would have hated to unwrap all those shells in all that cold. And so we headed on home, to a somewhat warmer San Diego, and to hours and days of unwrapping and cleaning and identifying the many shells our trip produced.

(Slides were shown of the beautiful places visited and a fine display of the superb specimens collected was also exhibited - C.A.M.).

"S A Y O N A R A"

From Dr. T. Okutani

GOOD-BYE, EVERYBODY! (And the keys to the species of Janthina)

I am leaving this country by February 13th. On this occasion, I like to extend my sincere thanks to all San Diego Shell Club members for their hospitality and warm hearts showed me during my stay at San Diego. You cannot imagine how I enjoyed in attending meetings every month since Betty brought me there one evening and introduced me to you all. The great "okazu" (with rice) party and X-mas dinner party were the most enjoyable and never-forgettable memories of my life. Many thanks are due to those who invited me personally to their houses to entertain me with not only showing their collections but also special dinners and food. I wish to leave this small note on Janthina here on the pages of friendly FESTIVUS because I have an impression that the most of collectors hold a good number of this beautiful violet snails in their collections under so many different names. I like to call your attention that Janthina contains only five valid species, that all show the world-wide distribution because of their pelagic drifting life.

The keys to the species were already given by Laursen (1953, Dana Report 38, p. 15) in his excellent monograph of this genus. But, I feel that his keys are too mucy simplified, that a more detailed and practical one is needed. So, I did it as follows:



1. Shell trochoid, low to moderately high spired; base purple and clearly demarcated by the sharp peripheral keel; viviparous so that egg capsules are never found underneath the float (bubble raft) - - - - - *J. janthina*

Shell globose, no sharp keel on the periphery; oviparous, so that sometimes egg cases were laid underneath the float (bubble raft) - - - - - 2

2. Growth lines show raised, regular ridges that give the shell rough surface; shell dark purplish throughout, lustre dull - - - - - *J. exigua*

Growth lines not raised, so that the shell surface is smooth or only delicately striated, usually with strong lustre - - - 3

3. Shell deep purplish except well-defined white line just below the suture; anal fasciole distinct; usually umbilicated - - - - - *J. umbilicata*

Shell pale purplish, gradually darkened basally, no white line below the suture - - - - - 4

4. Anal fasciole in lower position, so that it is seen only on the body whorl; columellar lip weakly curved but never twisted - - - - - *J. prolongata*

Anal fasciole in high position, so that it is seen not only on the body whorl, but also other upper whorls; columellar lip slightly twisted - - - - - *J. pallida*

The major synonyms (fide Laursen) of each species are shown below. If you find that your specimens were identified as any of these in parenthesis, you need to correct your label!

*Janthina janthina* (Linne, 1758): Syn. *affinis*, *africana*, *alaba*, *balteata*, *bicolor*, *bitannica*, *casta*, *carpenteri*, *coeruleata*, *communis*, *costae*, *depressa*, *fibula*, *fragilis*, *grandis*, *involuta*, *orbignyi*, *penicephala*, *planispirata*, *roseola*, *rotundata*, *smithiae*, *stulata*, *trochoidea*, *violacea*, *vulgaris*.

*J. exigua* Lamarck, 1816: Syn. *bifida*, *capreolata*, *incisa*, *nitida*, *striata*, *vinsoni*.

*J. umbilicata* d'Orbigny, 1840: Syn. *megastoma*.

*J. prolongata* Blainville, 1822: Syn. *decollata*, *elongata*, *globosa*, *iricolor*, *nana*, *nitens*, *payraudeaui*, *splendens*.

*J. pallida* Thompson, 1841: Syn. *latea*, *patula*, *rosea*, *striolata*.

In connection with this, brownish "violet" snail, *Recluzia*, also has very many names, such as *bensoni*, *montrouzieri* etc., but is a single world-wide species, *R. rollandiana* Petit.

By Jules Hertz

A recent addition to the Shell Club library is the small, hard-covered book, Marine Shells of Southern Africa, by D. H. Kennelly, Hon. Conchologist of the East London Museum. This book contains 46 excellent black and white (plus several color) plates of the more common shells of the Southern African region. The book is geared for the amateur collector. The descriptions are adequate, with the most interesting information being the locality data. Many of the shells from South Africa are also found in the Indo-Pacific, and therefore the descriptions of these shells duplicate those already available in several of the library's other books. A book covering the marine mollusks of the Southern African region has long been needed, and it is hoped that this book will act as a catalyst toward the writing of a more complete work in the near future. In the 'interim', this book will be quite valuable to those of us who exchange with collectors in Southern Africa.

We have received this past month a beautiful book donated by Mr. and Mrs. Laurence Thomas of Morro Bay, California. This soft covered book entitled, Hybridization in the Eastern Pacific Abalones (Haliotis), was written by B. Ownes, J.H. McLean, and R.J. Meyer. A review of this book is scheduled for our next issue.

Interest in the Shell Club library has increased markedly in recent months. With this in mind, it is requested that members return books that have been on loan for more than two months.

#### AQUARIUM OBSERVATION

By Carole M. Hertz

Our tank contains a ferocious hermit crab which patrols the area in its Calliostoma gloriosum shell. Friend crab climbs on all other inhabitants in the tank, pokes at them and in them and is ever on the prowl.

Yesterday Crab got its comeuppance. It had stuck its leg in one too many bodies. A tiny Donax gouldi reacted to the invasion and clamped tight imprisoning Crab's leg between its two valves.

Crab appeared furious. It clanked along with its new shell foot apparently trying to shake it off, grab it off with its claws or knock it off by banging it on the shell of Bursa californica, which seemed oblivious to the happening.

Crab suffered this indignity for more than ten minutes before escaping from the grip of the Donax. This is surely subjective but it seemed to me that on its release, Crab retreated to a corner of the tank to minister to its wounded leg.

## THE PELICANS' LAMENT

'Twas only yesteryear we flew  
strong and keen and free.  
In long and undulating files  
Winging our hungry way at dawn  
Toward distant feeding grounds.

Or, joyous coasting with the utmost ease  
And occasional beating wings,  
Close above the ceaseless, rolling waves  
Or even 'neath the breaker's giant curl.  
What zest in life indeed.

And then - when hovering aloft  
With eager downward look,  
Our sudden awkward crashing dive  
Which ended in a resounding splash  
That should have caused a broken neck.  
But lo - we emerged triumphant and unscathed  
To rest awhile on ocean's placid breast  
And fully enjoy a well earned meal.

But that of course was yesteryear,  
For now - how sad to say,  
Those earlier scenes will be no more.  
They are fading fast away  
As all we pelicans depart this life,  
And bitter memories alone remain.

No more we'll bring the happy hours  
To those who watch from shore and pier,  
And love to see we feathered folk  
Live out our destined ways.  
For, shame to say, 'tis those who should  
Our staunch protectors be,  
Oft' fail their duty to perform  
And carelessly destroy instead.

So one by one our countless hosts  
On land and sea and air,  
Will go and not come back again -  
Unhappy loss that all must share.  
And thus a priceless privilege is lost  
Because of mans' oft' selfish deeds,  
Whose interference spoiled our eggs,  
Took away from us our precious young  
And caused this requiem that we sing.

Edwin C. Roworth  
January 22, 1971

MINI MINUTES

Norm Currin's account of shelling trip noted above - also slides and specimens. Tom Rice of Poulsbo, Washington introduced as guest.

Membership voted to purchase Dr. S.S. Berry's "Leaflets in Malacology" - \$15.00 Also voted to set aside \$50.00 for additional book purchases.

"No change in meeting date" announced by President Taylor.

Cookies for March meeting - Mae Dean Richart and Ruth Purdy.

Joe Bibey won shell drawing.

San Diego Shell Club officially accepted role as host for WSM at Asilomar.

Dues schedule, 1971:

Single - \$3.00, family - \$4.00, Corres. membership - \$2.50 (U.S.A.) overseas - \$3.50

NOTICE:

Name tags are being renovated. Several are missing. Please bring to meeting next month so we can proceed!

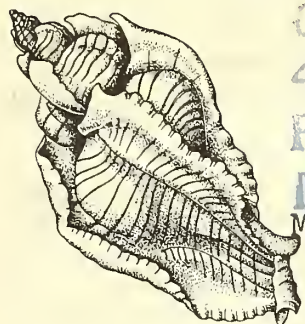




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## SAN DIEGO SHELL CLUB

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Museum of Natural History - Third Thursday - 7:30 P.M.

President: Roland Taylor  
Vice President: Clifton Martin  
Recording Secretary: Clifford Martin  
Corresponding Secretary: Virginia Hanselman  
Treasurer: Margaret Mulliner  
Editor: Blanche Brewer

Vol. II

April 1971

No. 4

\*\*\*\*\*  
\*Program, April 15: \*  
\*The Very Small and Microscopic Shells of Our Coast - Bertram C. Draper, \*  
\*of the Conchological Club of Southern California. \*  
\* \*  
\*NOTICE: \*  
\*We are still soliciting your donations of good shells (with data) for \*  
\*the Shell Auction May, 22. Please give them to any board member or \*  
\*bring to April meeting so they may be packaged and catalogued. \*  
\*Publications Address: \*  
\*Virginia Hanselman, 5818 Tulane St., San Diego, Calif. 92122 \*  
\*\*\*\*\*

### FLUORESCENCE IN MOLLUSCAN SHELLS

By Susan Bishop

This topic, like many which require interdisciplinary cooperation in the sciences, has not received the amount of attention from research workers that it seems to warrant.

The first work on the subject was published during the last century but since then only a few papers in this field have appeared and these concentrate mainly on the occurrence of fluorescence in chosen species of molluscs. One paper which attempts to determine the systematic range of one type of fluorescence among the mollusca was written by A. Comfort in 1948.

The phenomenon of fluorescence in daylight is a familiar sight to most people in such modern man-made articles as brilliant 'day-glo' posters, warning signs, and even certain clothes such as the bright red or orange jackets sometimes worn by roadworkers. The pigments and dyes used to produce these startling and sometimes unpleasantly dazzling effects are also man-made. As yet I have been unable to find evidence that any animals or plants exhibit similar colours due to fluorescence in daylight.

In the case of ordinary pigments, light consisting of a variety of wavelengths falls on the pigment and some of the light energy is absorbed. That which is reflected is seen as the colour of the pigment. The remaining light energy may be dissipated as heat, or alternatively as in the cases under consideration, it may be emitted as light of a different wavelength, in which case the pigment is said to fluoresce.

Many parts of animals and plants do show strong fluorescence in ultra-violet light. This is a wavelength (or colour) of light which is invisible to humans as it lies beyond the violet of the visible spectrum. Nevertheless it is visible to any insects and, in some cases, it is more important in controlling their behavior than those wavelengths of light that we term 'visible'. 'Black lights', which are often purchased for use at parties or for testing mineral samples, emit ultra-violet light strongly but are so designed that the amount of visible light emitted is very small. These are suitable for checking shells for fluorescence. Sun-ray lamps are also strong ultra-violet emitters, but the visible light also produced by these lamps makes them unsuitable for use in such a study.

Ultraviolet lamps should be considered potentially dangerous since long exposure of the skin to the light causes severe burning (as in sun-burn). This is particularly so in the case of the eyes which can be permanently damaged by looking directly at a strong ultra-violet source. This danger is best avoided by wearing ordinary glasses or goggles which cut out nearly all of the ultra-violet light. Use of a U.V. lamp in a small closed room for several hours should also be avoided, as the lamp causes the formation of small quantities of ozone and oxides of nitrogen which are poisonous gases.

Of the numerous different chemical substances occurring as pigments of shells, many show no fluorescence and few have been studied in any great detail. Work on the pigments of Pteria, Clanculus, and a few other species has been carried out in which pigments showing bright red fluorescence in U.V. light have been isolated from the shells and identified as belonging to a group of chemicals known as porphyrins. These substances are produced by animals and plants only, (i.e. are not found in rocks except where there are fossil remains.)

Shells which show red fluorescence on U.V. light are usually assumed to contain porphyrin. The identification of the pigment as a porphyrin in a particular species cannot be certain without an examination using physical and chemical analytical methods involving the destruction of specimens.

When a porphyrin is present in a shell in considerable concentration it is visible as a dull reddish brown or purplish colouration in normal lighting. It sometimes happens that the amount of porphyrin present is too small to show up and the shell appears almost colourless. The same shell however may fluoresce relatively brightly in U.V. light.

Because of the presence of other pigments in the shell, the distribution of the fluorescent areas may or may not correspond to any colour pattern which may be present. In some cases the fluorescence is confined to certain structural areas of the shell (e.g. the opercle or collumellar callus).



There is much individual variation within most species as to the degree of fluorescence present, and it is important to study a long series of specimens of a species before deciding that no fluorescent pigment occurs there.

In Comfort's paper on the systematic range of shell porphyrins he suggests from his studies that these pigments are widespread in the Archaeogastropods, occur fairly commonly in tectibranch Opistobranchs, and also in an isolated group of Mesogastropods including Erato, Trivia, \*Velutina and a few Cypraea. He gives no examples of Neogastropods. Although I have yet to examine any large number of specimens, a quick examination of some Neogastropods suggests that red fluorescence occurs in some species of Oliva, Conus and Harpa, at least.

The local shells showing the best fluorescence are Erato and Trivia. Very young orange specimens of Haliotis rufescens also showed some fluorescence, but very little could be found in other groups, including the pelecypods. Comfort gives such genera as Pteris, Pinna, Placuna and Mallens in his list of positive results and it is also possible that some Veneridae fluoresce. Very little work has been done using live animals and it would be most interesting to see how many of the molluscan animals fluoresce and how much of this can be attributed to the presence of porphyrin.

\* similar to Lamellaria.

#### Recommended reading

H. M. Fon and G. Vevers, (1960), The Nature of Animal Colours, Sidgwick and Jackson Ltd., London.  
A well written introduction to the subject.

A. Comfort, (1948), Acid Soluble Pigments of Shells. L. The Distribution of Porphyrin Fluorescence in Molluscan Shells. Biochemical Journal, 44, 111.

A. Comfort, (1951), The Pigmentation of Molluscan Shells. Biological Reviews, 26, 285.

(Susan Bishop is a young biology graduate from Cambridge, England. She and her husband, Martin, came to the San Diego area for a year that began last August. Mr. Bishop had decided to spend the middle year of a three-year university fellowship working in the Salk Institute at La Jolla.

Mrs. Bishop's interest in shells began when she was a small girl. While here, she has used every opportunity to collect and with her husband has made shelling trips to many California beaches and down into Mexico.

They will return to Cambridge in the late summer for Mr. Bishop's last year. Susan, herself, plans to teach in her field, biology. Happy landings and a rewarding future! - Ed.)



page 4

FROM OUR MAN IN ECUADOR \*\* WITH THE AMERIPAGOS EXPEDITION  
(from the letters and cards of Dave Mulliner to Peg.)

Dave reports, "We've had a very pleasant and eventful trip so far...." First stop for the group was Guayaquil, Ecuador. They cleared customs in five minutes. Didn't even have to open a bag. They sampled South American hospitality via an acquaintance they met on the plane. At the home of an Ecuadorian Naval Commander responsible for escorting American tuna boats into port, they were offered asylum for their gear while they visited Peru. The manager of the airport arranged for them to tour the city of Guayaquil. Due to storms, the river was covered with floating islands of water hyacinths. It was pre-Lenten carnival time in the city, and kids with ash-covered faces threw water balloons at everyone. Our travelers were waterbombed despite keeping the car windows closed.

After two days in Guayaquil, the group headed for Lima, Peru. A friend of Bill Old's took them on a tour of the beach and city and showed them his shell collection. They then went 50 miles up the coast from Lima and did their first shelling. They collected mostly Chitons, limpets and Acanthina. From there four of them went to Cuzco and visited the Inca ruins at Machu Picchu, "high on a mountain top surrounded on three sides by a raging river. The ruins are fantastic. Huge granite blocks cut to fit without mortar". They viewed the ruins "through a warm gentle rain for three hours".

Since all arrangements made in the States for shipment of gear had quickly evaporated on arrival in Guayaquil, the other members returned to make new plans. They spent three days in Guayaquil clearing customs and making arrangements for shipment by cement boat.

.... The last word Peg had, the plane was to leave at 8:30 AM and the flight was still being delayed at 11:00 AM.....

## A COLLECTOR OF RARE SHELLS, WITH NOTES ON IT'S REMARKABLE FAMILY

By Clifton L. Martin

To many of us one of the more interesting molluscan families is the Xenophoridae. To those who saw their first specimen of Xenophora as I did, without any previous knowledge of it's existence, the feeling caused is one of complete amazement, almost of disbelief. With my first view of Xenophora there was also a desire to learn more about the family it represented. To this end we made every effort to obtain as many species as possible and while our collection of the shells of this family is not large we do have examples of all of the different genera.

The family Xenophoridae is found in warm waters throughout the world and although it is a rather small one, as molluscan families go, it's worldwide dispersal is, perhaps, a clue to it's vast geological age as well as to it's ambulatory nature. It was living world-wide and highly differentiated at the beginning of the Cenozoic, in fact,

specimens of Xenophora are found in deposits of the Cretaceous epoch throughout the world. All of this indicates a geological age of very great magnitude. A superb model of Xenophora robusta Verrill in our collection, which was made by our good friend and fellow member, Helmut Meier, shows clearly that the animal is very well equipped for moving about.

All of the shells of this family prefer rather deep water and while a few have been found in depths of ten to twenty fathoms almost all prefer depths in excess of forty fathoms and some have been trawled in depths of nearly five hundred fathoms.

A study of this family will show that there are several different types or genera involved. First, and perhaps better known to most collectors, is genus Xenophora with it's more or less uniform covering of accreted shells, shell fragments, small pebbles etc. Another type may have only a very sparsely arranged number of attached shells, bits of coral or other matter from the ocean floor. This type is frequently found without any adherent matter whatever. Tugurium longleyi (Bartsch), from the Caribbean area, is a good example of this type. Tugurium giganteum (Schepman), from Japanese waters and southward to Indonesia, usually has shells and shell fragments attached only to the upper angle of the keel. As the shell grows these appear in a neat row just above the suture, giving the appearance of a very decorative coil when viewed from above. Species of genus Onustus are, more often than not, completely bare of accreted matter and if any is present it is usually in the form of very small and very thin shell fragments near the apex. From an esthetic standpoint the most beautiful shell of the family is, perhaps, Stellaria solaris. It's fine sculpture and beautiful arrangement of spine-like protruberances so uniformly spaced at the keel gives it a very distinctive appearance.

In a box of shells we received from South Africa recently there was an extremely unusual specimen of Xenophora pallidula (Reeve). It is unusual because of the rarity of the shells it has accreted. It is thought to be unique in being the only known specimen with a Lyria queketti (E. A. Smith) and a Volutocorbis gilchristi (Sowerby III) both attached to it. Strangely enough, both of these extremely rare volutes are in excellent condition and do not appear to have been dead very long. Other shells attached to this unusual specimen are Phalium craticulatum (Euthyme), two specimens of Gemmula gilchristi (Sowerby) and an unidentified turrid species. This specimen was trawled off the north coast of Natal, Republic of South Africa, June 1967, in a depth of about one hundred eighty fathoms.

Of special interest to shell collectors is the fact that Xenophora pallidula has not always been found in South African waters but has made it's appearance there rather recently. It is better known to most collectors as coming from the waters off Japan and Taiwan. According to D. H. Kennelly, Conchologist of the East London Museum, of South Africa, Xenophora pallidula was first found off the Natal coast about 1960. Since that time it has been helping the old-timer of the area, Xenophora corrugata (Reeve), supply collectors with some very rare shells, a few of which have never been collected in any other way.



## NIGHT DIVING IN THE PHILIPPINES

By Joe Bibbey

I am afraid this article will not contribute much to water safety or conservation, but I will attempt to tell it the way the usual dive was accomplished. I have done night diving periodically in my life, but never found it particularly rewarding until I became interested in the animals in the sand. The rock and corral-dwelling animals are much easier to find in the daytime, when they are hiding in lairs and the diver expects to find them in, and not running about all over.

My first 18 months in the P.I. I had found about 15 miters and like amounts of other sand dwellers by fanning sand, etc. I then became interested in Mitra and Terebra, so began a hunt for a good diving partner. I luckily found one who had a boat and we proceeded to dive two times a week for the next six months. This netted us over a hundred types of mitras, and around seventy terebras, plus many other shells we had never seen in the daytime. It took about two months of exploring to decide upon two nice offshore sand areas that weren't too far and provided sand, in depths from six to eighty feet. The deeper you go the less you find, but the little you find in the deeper water is of course more desirable.

On a typical night we would use three sets of twin 72's and never go over 35'. This gave us about seven good hours in the water. Our biggest problem was a light that didn't leak water. We tried out about four types before we found out that U.S. Divers made one for 12 Dollars that didn't leak. Every night on the way out we would decide to stay together and obey all the rules but somehow this never came to pass. When you step off the boat you always imagine a 50' whale is waiting with open jaws but a few moments later you are on the bottom and have found your first shells. This always leads to one more, 4 feet ahead of you - and on the tenth shell you take a check for your diving partner and discover that he is nowhere around. An uneasy feeling develops, but this is dispelled by a nice shell and anyway you can always get together back on the boat in a couple of hours. The little meeting on the boat gave us a chance to have a smoke and sandwich and to sort through the catch to make sure we hadn't captured any imperfect shells.

We worked over our two favorite sand areas once a week for the next four months and, except for a few old standbys, never found the same kind of shells two trips in a row. One night the bed had hundreds of Cassis cornuta on it. We decided to come back the next day and get some. My next find of Cassis on that bed, from then 'til now, is zero. Another night there must have been thousands (really!) of Strombus aurisdianae and bulla. We took several of each species. They have a peculiar habit - they travel in pairs, made up of one S. Bulla and one S. aurisdianae.

The most singularly beautiful shell I have ever found was a Conus episcopalis. Traveling at rather high speed over a sand bed, it looked like a brilliant black and white Christmas tree (to me, anyway). The Volutes have very large colorful animals that are breathtaking when you see one, but they are nothing compared to the episcopalis.

Beach combing one day, I found a quite beat-up mitra. I told myself "I have to find a live one of these." A few nights later we went directly offshore from my find and proceeded into the water of a previously unproductive area. When I reached the bottom, directly under the boat in twelve feet of water I found my Mitra, gracefully gliding across the sand. After a trip to the surface to show off my find, my friend and I diligently combed the area then, and for at least three nights but we never found another one. I didn't know the name of the shell then and I don't know it now.

I will describe my shell catch from the best night I ever had. No other night did I ever get more than half this much. These were all desirable take-home shells as far as I was concerned. It was also one of our last dives before leaving the P. I., so we hadn't done our areas any real damage, at least previous to this night. I found such a full excellent bag of shells that I counted them. Results? Mitra (32 species), Terebra (27 species), 20 (plus) other shells comprised of Strombus, Naticas, Volutes, Cones, Tritons, Turrids, Sundials, Semi-cassis, Dentalium, etc. I also had in this catch 7 Mitra and 1 Terebra that were brand new to my collection.

So far I haven't mentioned sharks in the article, as I had not seen one during this period at night. One time we continued diving : until sunrise. At this time I surfaced and was swimming toward the boat when I observed a huge Marlin catch and eat old Charlie Tuna. I estimate the tuna at about four feet long. And at a distance of about seventy-five feet from me the tuna left the water. The Marlin caught him in the air, biting him in two, taking the forward half with him. In about a minute (or less) he came back and got the other half. If a shark is faster and/or tougher than a Marlin then he must be a fearsome thing. I have never seen a shark do anything but sleep or swim away. I probably shouldn't have told you this story first as it leaves me nothing else to tell. This story was about the most fabulous period of time in my life. (As a shell collector)

## BOOK NEWS

By Jules Hertz

As noted last month, a new publication, "Hybridization in the Eastern Pacific Abalones (*Haliotis*)," has been received. Written by Buzz Owen, James H. McLean, and Richard J. Meyer, this soft-covered book was published in January 1971 as a Bulletin of the Los Angeles County Museum of Natural History (Science: Number 9). This book is printed on paper of excellent quality and has exceptionally good photographs. The first page consists of a beautiful color print of a *Haliotis rufescens* x *Kamtschatkana assimilis* from the Lawrence Thomas collection.

Hybridization in West Coast *Haliotis* has been suspected for years, but until this publication there was insufficient confirmation. With the exception of *Haliotis cracherodii*, each Southern Californian species of *Haliotis* was found to have hybridized with at least two other species. There are now twelve recognized hybrids. Evidence of hybridization is presented from 1) studies of shell and soft parts, 2) immunological studies, and 3) laboratory breeding experiments.



The epipodium of each species of Haliotis found in California has completely different morphology. Exceptionally fine pictures show the epipodia of the different hybridizing species as well as that of different hybrid specimens. Many of these are epipodia of living animals.

The results of laboratory breeding experiments are being published separately, but one hybridization experiment of H. corrugata and H. rufescens is detailed. Tables of frequency for naturally occurring hybridization are presented.

This Bulletin is a must for collectors of Haliotis and is of general interest to all collectors of molluscs.

#### THE LOST, BUT NOT FOUND DEPARTMENT

HELP!! The Historian's Book is missing. It's a black looseleaf binder containing photographs, clippings etc. of the history of the Club. It was last at the February meeting on the back table of the auditorium. If anyone has any information on this book please call - 277-6259.

#### COLLECTING IN SAN FELIPE

By Carole M. Hertz

During the low tides in February, Jules, the girls and I spent several lovely days in San Felipe together with Virginia and George Hanselman and Tom Rice. On the morning of February 25, at Campo Uno, Jules discovered a "bumpy tegula" we had never seen or collected before. We collected several during the morning tide and a few more the same evening.

We showed them to Joyce Gemmell, the Hanselmans and Tom Rice but none could identify the species. The following day we all searched for and collected some additional specimens. They were interspersed with Tegula falipensis on rocks, on sponge, under rocks and on small stones at the low tide level.

Since we still couldn't identify them with anything from that area: Joyce, Jules and I decided we'd send some specimens to Dr. James McLean for identification. And we had great fun creating names for our "new species"!!

Soon after arriving home, we did send some to him and found that we had collected Tegula rubroflammulata. Dr. McLean said that it is known from Puerto Penasco and south to Panama but that he didn't know of it in San Felipe. He felt that the muddy water might keep many species out of San Felipe but that perhaps some larvae of T. rubroflammulata had established a colony there.

It will be interesting to see if the colony becomes a permanent addition to the San Felipe area.

#### MINI MINUTES

President announces: New name tags will be issued to members not having them after publication of the new roster. - annual.  
Meeting of Western Society of Malacologist at Asilomar, June 16-19.  
Elizabeth Baker volunteered a ditto to print new library lists.  
Cookies for April meeting - Rose D'Attilio, John Souder.  
Shell drawing won by Elizabeth Baker.

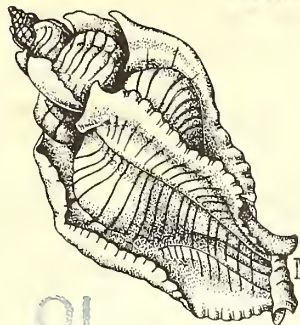
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## SAN DIEGO SHELL CLUB

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Museum of Natural History - Third Thursday - 7:30 P.M.

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Vol. II

May 1971

No. 5

\*\*\*\*\*  
\* SHELL AUCTION, May 22 \*  
\* Home of Dr. George Radwin, 4341 Rodrigo Dr. \*  
\* Map and Instructions, back page \*  
\* Publications Address: \*  
\* Virginia Hanselman, 5813 Tulane St., San Diego, Calif. 92122 \*  
\*\*\*\*\*

### "MINUTE SHELLS"

Presented by Bertram C. Draper

There are not many shell collectors who concentrate on the minute shells but when they do, they are very enthusiastic and dedicated students of these very special shells. Mr. Bertram C. Draper is just such a collector. He presented slides and information on specimens in his own collection to the San Diego Shell Club, April 15, in the Auditorium of the Museum of Natural History.

Mr. Draper became interested in the tiny shells several years ago when his son brought home a bag of broken shells and coarse sand-grunge. Seeing that some of the "sand" particles were definitely whole shells, he placed them under a magnifying glass and discovered an exciting new area of beauty in form and color. Since that time, though he collected the larger shells, he has gradually come to specialize in the minute shells.

Collecting areas are accessible to almost anyone since they are, for the most part, shoreline sites: the underside of rocks - tide pools, particularly when starfish and sea urchins are present - rocky areas with algae and anemones (in the anemones, under the algae) - hold-fasts of algae and eel grass. Fresh hold-fasts of seaweed and eel grass, with gravel attached, may be carried - home in plastic bags.



Dried, the shell material may be sorted under a magnifying glass - the very fine sand, sifted - for specimens. A binocular microscope, 1-60 power, and a lighted magnifying glass are Mr. Draper's "eyes" in sorting and identifying the shells. Using a 1970 penny as illustration of comparative size, the zero is exactly 1 mm. in diameter.

To identify his shells, Mr. Draper considers the following to be his best sources: Ida Oldroyd's, *Marine Shells of the West Coast of North America*, K. Palmer's *Marine Molluscs Described by Carpenter* (2 volumes, one of illustrations, the other, text), *Minutes of Conchological Club of Southern California*, *Smithsonian Bulletins*, Myra Keen's two books - *The Key and Seashells of Tropical West America* and James McLean's, *Marine Shells of Southern California*.

To mount and display his specimens, Mr. Draper uses flat plastic trays, placing double-faced scotch tape on the entire bottom inside to hold the shells and labels.

For his photography, he uses a PENTAX mounted on a rack with an adjustable 1-30 macro lens. His way of lighting accentuates the sculpture and illuminates the delicate transparency (of these fragile shells) with a jeweled brilliance that seems to glow from within. Particularly beautiful in sculpture was Liotia Fenestrata, a pearly luster in the squared pits in its coil. A lovely, unidentified Triphora was deeply sculptured and glowed like a topaz. Tricolia Rubri-lineata, with a satin sheen, was very colorful with "red candy-cane stripes". It is easy to understand how these so-very-small shells fascinate - and ensnare collectors.

(A collection of these minute shells was made years ago by a woman who was confined to a wheelchair. Edna Sweet spent many happy hours identifying the mounting the shells brought to her by friends. Her collection was given to the San Diego Museum of Natural History and has since been broken apart and incorporated, in proper relationships, in the main Museum collection.

Also - one of our earlier club members, unable to collect any shells himself, assembled an extensive collection of shells taken from kelp hold-fasts, brought home by his wife.

With adequate magnification and light and the proper handling tools - and PATIENCE - anyone can assemble a collection of them - and these shells need no cleaning! ed.)

When searching through grunge many small juveniles of larger shells are found along with the minutes. The first specimen slide showed 3 juveniles and 3 adults that are easily confused - the juveniles being a *Ceratostoma*, an *Amphissa* and an *Ocenebra* - the minute adults, a *Clathromangelia*, a *Nassarina* and a *Mitromorpha*.

There are over forty families on the west coast that include minute shells, normally under 12 mm, and totaling over 600 species. Mr. Draper has over 400 species in his trays. About thirty families were represented in his slides.

Shown were: Sinezona Rimuloides of Scissurellidae in the same super family as abalones.

Fissurellidae, Punctuella Cooperi and Megatebennus Bimaculatus.

Acmaeidae, Acmaea Rosacea, Notoacmea Triangularis, under rocks, low tide, N. Paleacea, N. Depicta, on eel grass stems, San Pedro to So. Baja Calif. - Collisella asmi, lives on black tegula.

Family Trochidae, Halistylus Pupoides, Solariella Paramabilis, S. Nuda, Lirularia Rhodia, L. Acuti Costata, L. Parcipicta, L. Lirulata

Liotidae, Liotia Fenestrata; Skeneidae, Parviturbo Britolae; Turbiniidae, Homalopoma Fenestratum, H. Lurida, H. Bacula, all found on rocks in tidal zone.

Family Phasianellidae, Tricolia Substriata, T. Lurida, Northern species from Neah Bay, Wash., T. Pulloides, T. Rubrilineata.

Lacunidae, Lacuna Fasciata.

Family Rissoidae, Amphithalmus inclusis, Nannoteretispiera Kelseyi, Barleeia californica, Alvania compacta, A. aequisculpta, A. inclusis, and A. tenuis, Rissonia bakeri, R. coronadoensis, R. californica, R. kelseyi.

Assimineidae, Assiminea californica.

Vitrinellidae, Vitrinella berryi, Teinostoma supravellatum.

Truncatellidae, Truncatella californica.

Family Caecidae, Caecum dalli, C. californica, Sub genus, Micranellum, species, Crebricinctum, Fartulum occidentale, F. orcutti.

Family Vermitidae, Sp. Petalococonchus, Dendropoma, Vermiculum annellum.

Family Cerithiidae, Bittium attenuatum, B. purpureum, B. munitum, B. interfossa, B. asperum.

Family Cerithiopsidae, Cerithiopsis cosmia, C. alcima, C. pedroana, C. oxys, Alaba cataliensis, Metaxia diadema, placed in synonymy with convexa, Seila montereyensis, S. assimilata, Diastoma fastiligata, D. stearnsi, D. sleveni.

Triphoridae, has backward whorls, Triphora montereyensis and 2 beautiful unidentified Triphora were shown, all deeply sculptured.

Family Epitoniidae represented by Opalia Spongiosa.

Eulimidae were Balcis rutila and 4 unidentified. They are found in kelp hold-fasts.

Eratoidea, spec. of Erato columbella.

Columbellidae, Aesopus chrysalloides, A. myrmecoon, Nassarina penicilata, Mitrella carinata, M. gausapata, M. tuberosa, M. aurantica, all from Catalina Islands.



Marginellidae, Volvarina taeniolata, Kogomea polita, Cystiscus jewettii, C. politulus.

Turridae, Clathurella canfieldi, Mangelia hexagona, Clathromangelia interfossa, C. fusciligata, Kurtzia arteaga, Daphnella bartschi, Oenopota pribilova, Mitromorpha carpenteri, M. aspera, M. gracilior.

Acteonidae, Acteon punctocaelata, A. traskii, Acteocina harpa, A. culcitella, Cylichna diegensis, Voluvella cylindrica.

Pyramidellidae, Iselica fenestrata, Ocostomia laxa, O. clathratula, Peristichia pedroana, Turbonilla nuttingi, T. tenuicula, T. castanea.

Ellobiidae, Pedipes unisulcatus, found in splash zone.

Siphonariidae, Williami peltoides under rocks, low tide.

#### IN MEMORIAM

Dr. Bertram Porter Brown. Died April 21, 1971, in Goleta, California. Dr. Brown was a well known Los Angeles physician until his retirement about six years ago.

#### A Brief Historical Review of the Genus SINUM Roding, 1798, and a Description of the Location of the Operculum

During a recent shell collecting trip in Mexico Norm Currin and I each collected a specimen of Sinum debile (Gould, 1853/1852). Although there was no sign of an operculum we decided to preserve the animals since Keen (Sea Shells of Tropical West America, 1958) indicated that the genus Sinum possessed a small operculum.

My interest in the subject grew when I learned that a number of prominent collectors were unaware of the location of the Sinum operculum. Worse yet, many others did not know that an operculum existed. The location of this well hidden operculum will be discussed at the conclusion of the article. For the present an explanation of the probable causes of this confusion may be of interest.

Abbott (Seashells of North America, 1968) contributes to the confusion when he states that "Sinum has none /an operculum/." Macpherson and Gabriel (Marine Molluscs of Victoria, 1962) state that in the genus Ectosinum Iredale, 1931, the "operculum /is/ absent." Habe (Shells of the Western Pacific in Color, 1964) disagrees, relegating Ectosinum to subgeneric ranking and describing the operculum as "... thin and horny".

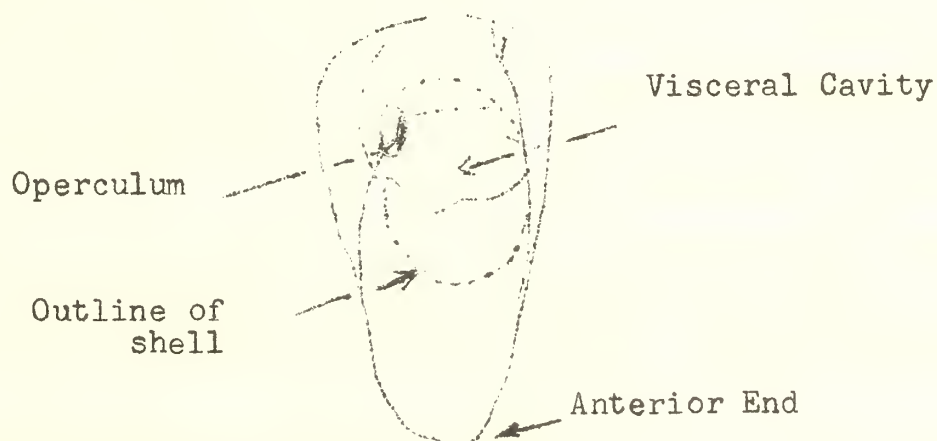
Untangling the relationships between Sinum, Ectosinum, Pervisinum, Helix, etc. will not be attempted here. It should suffice to say that most authors (including Oldroyd, Morris, Rogers, etc.) have correctly stated that the genus Sinum possesses an operculum.

This confusion can be traced to the efforts of early authors. Beach specimens of Sinum evidently prevailed, as evidenced by the fact that Dr. George Radwin labored for thirty minutes in his library before finding a satisfactory description of the animal. Without an intact animal for study early workers placed Sinum in Haliotidae, Calyptraeidae, Aplysiidae (Dolabella) and even more farfetched families.

Early synonyms include Sigaretus Lamarck, 1799, Cryptostomus and Cryptostoma Blainville, 1818 and Catinus H. and A. Adams, 1853. Until recently numerous authors have disregarded Sinum in favor of Sigaretus. The genus Sinum, however, was first described by Roding in 1798 in a catalog published by Bolten. This explains why Oldroyd (The Marine Shells of the West Coast of North America, 1927) mistakenly cited Bolten as the author of Sinum. An unfortunate misprint (Sigaretus Lamarck, 1789) by Smith (World-Wide Sea Shells, 1940) doesn't help the layman decide priority.

At this point a brief discussion of the Sinum operculum and its location is appropriate. Olsson and Harbison (Pliocene Mollusca of Southern Florida, 1953) described the operculum as "...corneous, smaller than the aperture, paucispiral with the basal border subrostrate." The animal itself appears to be a lump of fat, featureless compared to many other gastropods and nearly enveloping the shell. When the animal is alive the operculum is not visible.

The shell is easily removed from the animal by cooking it in water for a brief period and then lifting the shell off. With the anterior end of the animal pointing toward you, pull back the rear flap of flesh covering the visceral mass. The small operculum is on the left rear side of the visceral cavity. (see illustration for location).



Dorsal View of Sinum

At this time it is only fitting that I acknowledge those individuals who made this article possible, namely Dr. George Radwin, who kindly helped me to research this article, and Norm Currin, who graciously volunteered my time and energy to the Festivus.

William L. Woods

## A NEW SYSTEM OF CLASSIFICATION AND IDENTIFICATION FOR THE CLASS AMPHINEURA

By John Myers

My purpose in this project was to find a better, more positive way to identify chitons. I had found previously that identifying chitons was an unsure and difficult undertaking.

I proposed to remedy this problem by experimenting to see if I could identify chitons by using their radula.

Over a long period of time, I collected many chitons. I then dissected each one and removed the radula. This I was able to do rather easily because of the large size of the radula ribbon and because of its adequate strength.

I then observed these radula under a microscope. The first thing I looked for was to see if the radula were consistent within the species, that is, that the radular teeth of one species were all the same. I found that this was so. I could therefore know that a classification system based on these radula would indeed be valid.

Next I made careful sketches of the various types of radular teeth that I observed. When I brought these sketches together to evaluate them I found that similarities in the radular teeth did not coincide with similarities in the external features upon which the present classification is based. For instance, I had four species of Stenoplax in which none of the radular teeth resembled each other. The same was true for the rest of the chiton genera that I used.

This prompted me to make a generic classification key based solely on differences in the radula. This conflicted widely with the present classifications of my chitons, but so far I have found nothing wrong with my system, and neither has anyone else.

(John (Mike) Myers received first prize for his exhibit in the senior division, Zoology, at the Science Fair for Juniors in San Diego. He was invited to show his exhibit at the California State Science Fair in Los Angeles, May 20. He has also been invited to the Del Mar Fair - properly, The San Diego County Fair, in June.

With his parents, John and Barbara Myers, the San Diego Shell Club is very proud of this young man and his developing talents. He is, already, a capable artist. Ed.)



## ATTRACTING NASSARIUS MUD SNAILS TO BAIT

It is well known that most Nassarius Mud Snails are scavengers, feeding upon dead animal matter. They are able to detect products of decomposition dissolved in the water, and are attracted from a considerable distance. The snails may be difficult to find when not feeding, as they spend much of their time buried in the sand or mud with only the siphon protruding.

In order to investigate the Nassarius population of an area, all that is necessary is to put down a piece of stale fish as bait. Within minutes the snails will be observed digging out of the sand and congregating on the bait in large numbers.

In an area of Mission Bay, San Diego, all four common Southern Californian Nassarius species may be found living in close proximity. Nassarius tegula (Reeve) is found at the low tide line and is commonly observed in large numbers at the surface. Nassarius fossatus (Gould) has been seen ranging from low tide, in the zone occupied by N. tegula, into the shallow subtidal, and individuals are usually singly scattered over a wide area. This species was spawning during the third week of March, 1971. Nassarius perpinguis (Hinds) and N. mendicus (Gould) have been rarely observed in the shallow subtidal area, often in the vicinity of beds of eelgrass (Zostera). It was with these species that great success was obtained by baiting. After several hours of searching on a number of occasions we found 20 perpinguis and 6 mendicus, but at bait 118 perpinguis and 30 mendicus were counted in fifteen minutes.

We have evidence that N. fossatus is sometimes carnivorous. One specimen of this species was observed with its shell above the sand but its foot buried. On inspection it seemed that it was attempting to eat a live and healthy clam (of a species as yet unidentified, but resembling a young Spisula). The foot of the snail was enveloping the clam and when it was forcibly removed the bivalve shell showed crumpling and cracking at the anterior edge of the valves.

M.J. Bishop and S.J. Bishop

## BOOK NOTES

By Jules Hertz

The following publications have been received and/or purchased within this last month.

Echo, The, Abstracts and Proceedings of the third Annual Meeting of The Western Society of Malacologists.

Leaflets in Malacology, (Vol. 1 #1-26, by S. Stillman Berry (Club purchase)

Malacologia, Proceedings of the American Malacological Union, Symposium and Rare and Endangered Mollusks



Pittsburgh Shell Club Bulletin, Mar. 1971 (Annual publication)

Of Sea and Shore, Vol. 2 #1, Spring 1971

Tabulata, The, Santa Barbara Malacological Society, Inc., Vol. 4  
#2, April 1971

The Shell Club Library List is now being mimeographed and will be available for distribution at our next regular meeting. We ask that the members keep these lists in their files. In the future supplementary lists will be published to keep this 1971 list current.

#### SPECIAL NOTICE

Dr. Martin Bishop and Mrs. Susan Bishop of 1066 1/2 Tourmaline St., San Diego 92109 are compiling a list of shelled marined mollusks found in San Diego over the past 5 years. They would be grateful for the opportunity to examine live collected material with adequate locality data particularly of the less common species.

#### ADDITIONS AND CORRECTIONS TO THE ROSTER

Burch, Rose A. (John Q.)  
1300 Mayfield Rd. Apt. #61L  
Seal Beach, Calif. 90740  
Phone 596-7737

Taylor, Dr. Dwight  
Dept. of Marine Invertebrates  
Museum of Natural History  
P.O. Box 1390  
San Diego, Calif. 92112

Pisor, Don (Jeanne)  
3269 Kearny Villa Rd.  
San Diego, Calif. 92123  
Phone - 279-9342

#### CHANGE OF ADDRESS

Farmer, Wesley (CM) (Michaelene)  
1327 E. Donner Dr.  
Tempe, Arizona 85281

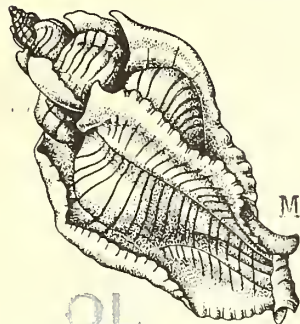
Myers, John & Barbara & John, Jr.  
3761 Mr. Augustus Ave.  
San Diego, Calif. 92111  
Phone - 279-9806

Webb, Ray & Kay  
Rigdon, Marie (Mrs.)  
501 A Anita St., Space 186  
Chula Vista, Calif. 92011  
Phone - 420-4900

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## SAN DIEGO SHELL CLUB

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Museum of Natural History Third Thursday - 7:30 P.M.

President: Roland Taylor  
Vice President: Clifton Martin  
Recording Secretary: Clifford Martin  
Corresponding Secretary: Virginia Hanselman  
Treasurer: Margaret Mulliner  
Editor: Blanche Brewer

Vol II

June 1971

No.6

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\* PLEASE NOTE: Meeting, June, 24 \*  
\* PROGRAM: SHELL COLLECTING IN THE GALAPAGOS - David Mulliner \*  
\* PUBLICATIONS ADDRESS: Virginia Hanselman 5818 Tulane St. \*  
\* San Diego, Calif. 92122 \*  
\*\*\*\*\*

### SHELL COLLECTING IN SOUTHERN SPAIN

By Phillip W. Clover

During my 2 years in Spain I have collected from Huelva - the famous port where many sixteenth century ships left to explore the New World - to Valencia well into the Mediterranean Sea. As we live near Cadiz most of the shells I have found are from this area. One can only drive so far to catch a low tide. Skin diving is quite cold here and visibility is never over 10-20 feet, so most collecting is done on reefs at low tide.

Southern Spain does have some of the finest clear weather I have seen anywhere in the world and most of the reefs are void of people except near towns and during the summer tourist season. One can walk by 3000 years of history in Cadiz and even find shells on the walls of a sunken Phoenician city in this area. So regardless of what shells are found, an outing to the beaches and reefs is always enjoyed.

Usually we collect only 10-20 different species in any one area. Playa De Costilla, in Rota Bay five miles across from Cadiz, seems to be an exception. This bay is blessed (??) with all the town's garbage and while I would hate to swim here, the shells seem to love it. About 500 yards offshore is a very large reef that is only exposed during the lowest .5 tides, a normal low tide being 2.0-3.0 feet.

On one recent collecting trip at Playa De Costilla I found 51 different species as no real low tides had uncovered this reef in three months. It seemed that half the town's population realized this also and were out on the reef looking for species of bivalves they could eat. Close to shore, in mud banks, they dig Pholas dactylus Linn. The collector soon looks like the mud bank, as it's messy work. Out towards the reef, in gravel/mud/weed banks, are dug Cardium edules Linn., Mactra sugoszi Chem., Lutraria elliptica Lam., and Tapes decussatus Linn. These bivalves are collected by the bucket full and sold in the local markets. On the reef itself I find most of the rocks turned over for me as the Spainards are looking for squid and sea urchins. As the .5 tides run in a 3-day cycle, it's hopeless to turn them back as they will just be turned each day and maybe 50% end up in their original positions. Since no one else was looking for small specimen shells it was a real field day for me and some of the more interesting species found were: Calliostoma zizphinum Linn., Columbella rustica Linn., Conus mediterraneus Linn., Cypraea pyrum Gmel., Chiton olivaceus Spen., Fusus rostratus Oliv., Fissurella graeca Linn., Mitra ebenus Lam., Murex blainvillei Pay., Murex trunculus Linn., Nassarius reticulata Linn., Natica vittata Gmel., Ocenebra edwardsi Payr., and Ocenebra erinacea Payr.

Another form of shell collecting here in Spain is meeting the fishing boats as they return from trawling off the fishing grounds-"La Caballa" S.W. of Cadiz city in 20-40 fathoms. As the fisherman pull their nets up on the pier, I often pick out Cymbium olla Linn., Murex brandaris Linn., Halia priamus Gmel., and Cassis saburon Brug. Some years ago they used to collect Cypraea achatidea Sow. in their nets also, but the style of nets and trawling methods have changed and the achatidea is no longer collected, sad to say, since it's very popular with collectors.

#### AQUARIUM OBSERVATIONS

By Carole M. Hertz

On April 18 of this year I collected two Cypraea spadicea which we put in one of our two one gallon aquaria. Both shells were approximately the same size, found on the same day in different areas of the jetty in San Diego. Both shells had slight defects which I hadn't noticed on collecting them, but for which I was later thankful since it made it easy to tell them apart. Almost immediately after placing them in the tank, the one cowry went to an end of the tank and remained in one small area. I noticed that the foot of this animal was much larger than the other's and spread out in a more or less heart-shaped pattern, different from any other C. spadicea we'd observed before.

By April 28, we observed particles between the foot of the cowry and the glass. The amount of particles seemed to change and the position of the particles under the foot differed from time to time. Sometimes none were visible and other times we could see up to six. Our assumption was that these were egg capsules. We had read that the cowry will sit on her eggs to protect them after they are laid in rock crevices

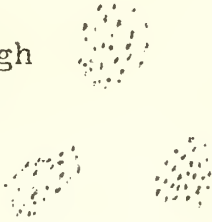
Cowry on glass



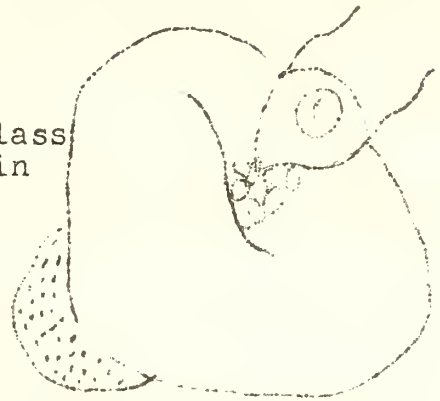


(Abbott in SEASHELLS OF NORTH AMERICA and Burgess in THE LIVING COWRIES.). If this is so, we were getting a most unusual view of these eggs while they were developing.

Eggs as they appeared through our magnifying glass.



Cowry on glass with eggs in "clutch"



On the morning of the sixteenth of May, we counted at least eight "clumps" of eggs near the anterior end of the foot, in a "clutch" shaped area. The cowry was still on the same small section of glass. We called Dave Mulliner and asked (demanded) him to please come up and see if he could get some pictures of this. (Doctors may not make Sunday house calls but our photographer did, and he was here within an hour). The position of the eggs had changed again by that time and only a few were visible. Dave got some excellent shots which he will show at a future Club meeting.

By the 23rd of May the animal's foot seemed smaller, though still larger than that of the other cowry, and no eggs had been noted for four days. (During this whole period we have been watching for veligers but have seen none. It is more than likely that conditions in our very small tank are not suitable). On the 24th, the animal left the small area of glass and now has settled for the second day on the adjacent panel. The foot appears "normal" in size and shape and no eggs are in evidence.

Though we have not seen any veligers throughout, we feel that we have been treated to a rare glimpse of Nature.

#### BOOKS NEWS

By Jules Hertz

After considerable searching, the Shell Club library has obtained a complete collection of S. Stillman Berry's Leaflets in Malacology. These leaflets cover all mollusks: salt water, fresh water and land. They are of particular interest to local collectors since they contain the original descriptions of many of the shells found in Southern California, San Felipe, Baja Calif. and Puerto Penasco, Sonora, Mexico. It is quite eye opening to find that some of the shells fairly common in San Felipe were not described until the 1950's. For those of us who are relatively new collectors, it is a good indicator of how rapidly Mexico is developing.



In general, the descriptions are excellent. However, there is a tendency to sub-divide. The general lack of sketches or photographs of the shells imposes some difficulties on the amateur collector. The Leaflets include articles by Dr. Berry, Dr. Dwight Taylor, Dr. Burce Halstead, Dr. Joshua Baily Jr., Ralph Arnold, John Fitch and Allyn Smith.

The Leaflets will be placed in a soft covered binder and will be available in the library at the June meeting.

### AQUARIUM OBSERVATIONS

By Suzanne Hertz (aged 9½)

We have two Cantharus macrospira in our tanks. We found them at San Felipe and put one in each tank. They both had eggs on them, since it was mating season. The Cantharus macrospira's eggs are always on the backs of their shells.

It has been about two months since we took them and now it looks like there are baby Cantharus. The babies walk around the walls of the tank. They don't move very fast. They're about three millimeters long. I have counted two so far.

(How about the family that writes together? Ed.)

### THE SHELL AUCTION

Our annual shell auction seems to grow progressively better each year - the attendance is larger, shells are of better quality and a greater sales total is realized through the bidding.

This year the auction was held at the home of Dr. George Radwin. There was time before bidding began to socialize, preview the shells and enjoy a potluck dinner.

Auctioneers were Dr. Radwin and Norman Currin and bidders included members from out of town and guests from as far away as Texas.

Among notable specimens offered was a case of three Delectopecten randolphi tillamookensis, Arnold. These were taken by divers in 3,400 feet of water from a WWII Grauman Hellcat, ditched more than 26 years ago. The bidding on these was very lively.

We must thank the generous donors who made the auction possible. The shells, in many cases, were outstandingly beautiful - all were of high quality and a desirability that brought very good prices.

## A FIND

By Nola Michel

I want to report a finding! I found Oxynoe panamensis Pilsbry and Olsson 1943 on Dec. 27, '70, in Bocochibampo Bay, Guaymas, Son. Mex. - which is a range extension, I've been told. I had quite a time finding a name to put on this little "critter", as most of my fellow shellers, with much more experience than I, hadn't the foggiest notion what he was. It looked like a bubble (kind of) but had no sunken spire. Was very small, between 5 and 7 mm. - has a pearly white shell with a very thin periostracum. There is no operculum. The animal is beautiful. It is olive-green with an overlaid pattern of gold and dark brown. The tiny shell lies partially exposed in the middle of its very elongate body. The length of the shell was only about one sixth the length of the animal. The animals were plentiful where I found them, so thinking them common, I took only enough for my own needs. They were located near the bases of rocks in mud. We found them on a stretch of rocky beach over a distance of about 300 ft. When we neared a sewage outfall we found them no more - and they were not found on the other side of the outfall. I understand that the veligers of this family are long-lived pelagic creatures, explaining an abundance in an area at one time and none, at another. Water currents carry the next generation to a new location. The genus Oxynoe Rafinesque 1814, is in the family Philinidae (Keen, TWA, p. 498) or Oxynoidae (Thiele, p. 411). Lobiger is in this same family.

## HONORS

Our younger member, John (Mike) Myers, has again distinguished himself. He received third place in the Senior Division, Biological, at the California Science Fair held in Los Angeles in the Space Museum. He competed for the second time with his science study on a new system of classification and identification of the class, Amphineura. This exhibit received first prize in the Zoological Division at the Junior Science Fair in San Diego.

## THE FRIENDLY SEA

Page 6

By Edwin C. Roworth

Oh the joy of life beside the sea  
Carefree as the winds that blow  
Lazily stretched on a sunny beach  
Talking to those we know.

Also the beauty of friendships  
Its secrets we may not tell  
But just to feel the soft warm sand  
And to know that all is well.

We see the glory of the dashing waves  
Blue-green or sunset gold  
One may hear the story they seem to tell  
But the half has not been told.

We ponder the mystery of the infinite deep  
What breadth and depth and bulk  
Where countless waves forever roll  
O'er many a battered hulk.

We think of the tide: its rise, its fall  
How majestic is its force  
But though we ponder and study it all  
We cannot fathom its source.

Great billows crash and surges beat  
When wild winds blow amain  
But even the storms are quickly past  
And we're out on the shore again.

We spend our days on the city streets  
In school and office and mart  
But our spirits long for a wide sea beach  
Close to friend Nature's heart.

'Tis a life to live where the breakers toss  
And the salt spray dashes free  
For 'tis there true happiness can be found  
Ever for You and Me.

## NEW MEMBERS

Sphon, Gale (CM)  
L.A. County Museum of Natural History  
900 Exposition Blvd.  
Los Angeles, Calif. 90007

Bender, James F.  
2540 Glenwood  
Port Arthur, Texas 77640





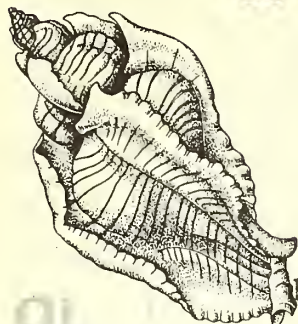


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## SAN DIEGO SHELL CLUB

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Museum of Natural History - Third Thursday - 7:30 P.M.

President: Roland Taylor  
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Recording Secretary: Clifford Martin  
Corresponding Secretary: Virginia Hanselman  
Treasurer: Margaret Mulliner  
Editor: Blanche Brewer

Vol II

July 1971

No. 7

\*\*\*\*\*  
\* PROGRAM JULY, 15: \*  
\* "The Intritacalx, A Chalky Surface Layer of the Mollusk \*  
\* Shells" - Dr. George Radwin \*  
\* Publication Address: \*  
\* Virginia Hanselman, 5818 Tulane St., San Diego, Ca. 92122 \*  
\*\*\*\*\*

### REPORT ON THE AMERIPAGOS EXPEDITION

By David Mulliner

#### FOREWORD

David Mulliner was the speaker at our June Meeting. He was a member of the Ameripagos Expedition to the Galapagos Islands (Feb 21 through March 29)--a group which included several members of the San Diego Shell Club. His introduction to the showing of his slides follows--ED.

Tonight I want to take you on a trip to the Galapagos Islands. 650 miles west of Ecuador lies the Archipelago de Colone, volcanic islands rising steeply out of the sea and covering 20,000 square miles of area on the equator.

The smaller islands and the lowlands of the larger ones are desert, lava, brush, and cactus. The highlands of the larger islands are damp with lush tropical growth. Volcanic activity started in the early Pleistocene and has continued to the present; the last lava flow was in 1968. Of the 15 major islands, 4 are as large as Catalina, and one is 80 miles across.

Steeped in lore, the islands were discovered in 1536 by the Bishop of Panama on an ill-fated, becalmed, drifting trip to Peru (Fray Tomas de Berlanga). Buccaneers sailed these waters and used the calm cliff-protected Buccaneer Cove of James Island. Whalers raided the tortoise colonies for fresh food on the high seas. Many settlers came with their domestic animals. Most found the islands rugged and the climate too harsh; and left leaving their animals behind to go wild. The wild goats stripped the vegetation - the pigs, dogs, and cats killed the young tortoises and sea turtles - the fur seals were killed almost to extinction and the feather hunters of the early 1900's almost eliminated the flamingos. Zoos throughout the world vied for endemic animals and birds.

In 1835, Charles Darwin aboard the Beagle visited San Cristobal and Floreana. Darwin noted (and I am quoting): "that the different islands to a considerable extent are inhabited by a different set of beings". Spatial isolation, which through untold centuries had molded curious insular endemics out of traditional continental species, was the powerful discovery of Darwin in the Galapagos, and the basis for his "Origin of the Species" in 1859.

In 1959, UNESCO formed the Charles Darwin foundation with a research station on Academy Bay, Santa Cruz Island. The Ecuadorian Park Service and the Darwin Station are eliminating the wild domestic animals from the islands and protecting the endemic species. A tortoise rearing center has been set up with funds provided by the San Diego Zoological Society. Today, tourists may visit and see fur seals, flamingos, land and sea iguanas, and many other species which were headed for extinction just a few years ago.

Among the many beautiful slides shown were scenes of Guayaquil, Ecuador and of Lima and Cuzco, Peru. Very interesting were the slides of the ancient Inca ruins of Machu Picchu. The slides of the Galapagos Islands showed plant and animal life as well as the terrain of those unusual islands.

He showed many slides of the intertidal areas of all the islands visited and his slides of the molluscan life included both intertidal and deep water species. All of these showed the living animal.

Other slides shown were of a living Cypraea spadicea, with eggs, in the aquarium of Jules and Carole Hertz and some pictures he took of the Club Auction.

#### A REPORT ON THE W. S. M. MEETING

By Clifton L. Martin

The annual meeting of the Western Society of Malacologists was held at Asilomar, June 16-19, this year. Although the attendance was not as large as it was last year, since the meeting date occurred during the last week of the school term, it was a very successful meeting and greatly enjoyed by everyone.



Since our Club was officially designated as the host Club for this meeting it was our duty to supply coffee and doughnuts during coffee breaks and provide table decorations and favors for the banquet. Kay Webb did a beautiful job of preparing the favors and Mae Dean Richart missed an entire session of the meeting by staying in her room to clean and prepare the shells for table decorations. To Roland and Kay Taylor must go the credit for the successful completion of all other duties. They made the arrangements for everything and our Club's obligation as host was carried out so smoothly that there was nothing required from the rest of us, although we were standing by if needed. Incidentally, Roland exhibited at least two hidden talents during the meeting. First, I must mention the beautiful flower arrangements for the speaker's table at the banquet. They were his work entirely. Second and probably more interesting, is his skill at preparing a delectable concoction called a Margarita, about which I will tell in more detail later.

Registration did not begin until 3:00 P. M. of the first day so after registering we were free to renew old acquaintances and meet new ones until the dinner hour. After dinner the Conservation Session was held, with very informative talks by Dr. Eugene Coan, of the Sierra Club, San Francisco, and President of the W. S. M., and by James T. Carlton, of the California Academy of Sciences. Later that evening we were treated to a slide show of the Galapagos Expedition by Twila Bratcher. In the Chapel, where the regular sessions were held, Twila displayed the shells she received from the Expedition. To me the real prize among all of her shells is a magnificent, large Epitonium sp. which appears to be very similar to Stenorhynchis pernobilis found in deep water off Florida and southward.

Among other exhibits shown was a fine collection of Murex belonging to Virginia McClure of Beverley Hills. This was to help emphasize the Symposium on the Muricidae, a very important part of this year's meeting. There was an excellent exhibit on the systematics of the family Turridae by Dr. James H. McLean, of the Los Angeles County Museum of Natural History. His exhibit showed the systematics to be used in the new edition of "Sea Shells of Tropical West America", by A. Myra Keen. Those having large collections of west American turrids will have several labels to change when the new edition is released. Another display case contained some of the proof pages, including color plates and a jacket, from the new edition. It will be much larger and thicker than before. Dr. Keen, in her report on it's status, told us that it may, hopefully, be released by the end of Aug.

The Symposium on the Muricidae was held on the second day of the meeting. It was under the chairmanship of Dr. William K. Emerson, of the American Museum of Natural History and papers were read by Dr. Myra Keen, Dr. George Radwin and Dr. Edmund Smith. Dr. Emily Vokes, of Tulane University, New Orleans, had prepared a paper but was unable to be there to present it since she was on an expedition to Brazil. Her paper was read by Anthony D'Attilio.

In the afternoon several papers were read on other molluscan families. They were "The Corbicula Story: Chapter Three", by Ralph Olen Fox, of the California Academy of Sciences, "Tropical Eastern Pacific Cancellaridae", by Dr. Donald Shasky, "West American Caecidae", by Mr. Garrell E. Long, of Arizona State University, "West Coast Chitons", by Glenn Burghardt and a sound tape and slides shown by the Vokes, titled "What is a Fossil".



The auction was held that evening with Glenn Burghardt acting as auctioneer. Even with a smaller attendance this year the income from the auction was greater than it has ever been. To me went the dubious distinction of paying the highest price but since there was only one thing offered that I needed my total expenditure was much less than some of the other bidders. I got a plastic box containing 39 families, 64 genera, 116 species, a total of 155 shells, all of minute to microscopic size. The box is systematically arranged and was prepared and donated by Bert Draper of the Conchological Club of Southern Calif.

Friday morning the Nudibranch Symposium was held. Several interesting papers were read and some very beautiful slides were shown of the living animals. In the afternoon a number of miscellaneous papers were presented, including a very interesting one on "Food Preferences of Conus in the Sea of Cortez", by Dr. James Nybakken and "Anomalous Records of Introduced Estuarine Mollusca of California", by James T. Carlton. After a coffee break, Robert R. Talmage presented a paper titled, "Life in a Benthic Sponge". This was followed by another very interesting paper, "What is Ischadium?", by Dr. Vida Kenk, of San Jose State College. This paper pertained to the mussel shells of this coast, both native and introduced species.

Friday evening the banquet was held, with Dr. R. Tucker Abbott as speaker. It was here that our Club was highly commended by President Coan for our performance as host Club. Dr. Abbott gave a most interesting and amusing talk about some of his experiences with his books and other publications and about the Delaware Museum of Natural History. A film was presented by Dr. Abbott, starring Mickey Rooney and John E. du Pont, which showed some of the frustrations and difficulties Mr. du Pont encountered in trying to find a Voluta Perplicata while on an expedition to Australia. Dr. Abbott also told us that the revised edition of his book, American Seashells, will not be ready until next year but will be much larger, both in scope and format. It will be published in two volumes and the pages will be printed in double columns. Authors names and dates will be given and the entire work will be somewhat like an illustrated check list of American marine shells. The price is presently estimated to be about \$36.00 for the two volumes.

During the banquet an Award was presented to our friend 'Tony' D'Attilio for his outstanding contribution to the study of Malacology over a long and continuing period of time. In the many years this award has been established it has been given to only a very few recipients.

The Saturday morning session brought the meeting to a close. A paper by Dr. Rudolph Stohler, beautifully illustrated with slides, and titled, "Practical Ecology for the Shell Collector", was the highlight of this session.

Now, to get back to those margaritas of Roland Taylor. All of us in the San Diego "delegation", including Kay Webb, Mae Dean Richart, Joyce Gemmell, Dr. George Radwin, 'Tony' D'Attilio, my brother Clifford and I got into the very pleasant habit, at their invitation, of dropping in on the Taylors every evening before the start of the W. S. M. activities for our own San Diego Session. It was here that Roland's talent was revealed to us. A most pleasant and relaxing climax to each day's events.

ATTENTION ALL MEMBERS

We need articles for our paper. This is YOUR paper, a vehicle in which to share your shelling experiences - whether or not you have seen something in your aquarium or in the field. We want to know about your latest trip, or if you have found a new way to clean something--or even if you've goofed in some way. Maybe it would save one of us from the same goof. How did you become interested in shells? Only you know, unless you share your story with us. For those of you who are long distance corresponding members it may be the only way we can know you. (Although I have met some of our far-flung members in other far-off tide-pools.) If you can write a letter to a friend you can write for the Festivus. Please share your experiences with us, now and often!! Your article does not have to be typed, only legible. We have a good committee. Someone will type it for the printer and our competent editor will go over it for grammar and spelling, so if you're like me and spell terribly, you have no worry. Please write. We need to hear from YOU.

## BOOK NOTES

By Carole M. Hertz

The Club is now exchanging publications with Molluscan Digest, published monthly and edited by Steven J. Long and Jack Brookshire. The editors aim to aid researchers in malacology and list their primary objectives in their first issue.

"1. To provide a complete list of all molluscan researchers, their interest areas and their current addresses...(continuously updating)

2. To provide complete, accurate bibliographic citations for all papers published concerning mollusks.

3. To provide space for workers to contact large numbers of their co-workers with requests for information, papers or specimens, or to offer the same items to other workers.

4. To provide a forum for informal discussion of malacological ideas and problems."

This writer has found the Molluscan Digest a most informative publication. Besides its listing of Current Citations and news of New Publications, the Current Events and Readers Forum provide useful information for the professional and amateur.

The library has Vol 1, Nos. 1-6 in a turquoise binder. Each month's issue will be included as it arrives.

Also in the library at this writing is Tom Rice's List 65- Shells of the Eastern Pacific, issued August 1, 1970 and donated to the library by Tony D'Attilio. Although this is basically a price list, those interested in Eastern Pacific shells will find it enjoyable as a compilation of species of the area. (Gives the collector an idea of how many he's missing in his collection!)

Susan and Martin Bishop have generously donated to the library, Norman Tebble's, British Bivalve Seashells. This is an excellent little book for the bivalve enthusiast and will be reviewed in greater detail in our next issue--when our regular librarian returns to his job!

By Barbara Myers

"What is so rare as a day in June" when you look in your aquarium and find that the crumby looking Bursa californica you have had for 1 1/2 years has grown a new body whorl (in a Bursa this means that more than half the shell is new) and it is not only twice as big, but is now the main attraction in your "sea world".

Actually it was February when I first noticed this phenomenon taking place and at that time the whorl was about one-third completed. The Bursa was collected in Sept. 1969 at Punta Banda, B.C. It lived quite peacefully with the rest of the inhabitants of the aquarium until the day I put in a purple sea urchin. Within minutes the Bursa appeared with its long elephant-like snout searching back and forth. It located the urchin and devoured same, notwithstanding the spines which it appeared to enjoy as much as the rest of the animal.

With its new body whorl completed this month (June), it now measures 65 mm compared to 43 mm when collected. Compared with the dingy white of the upper whorls the new growth is a lovely light tan with five narrow dark brown stripes. The aperture is now a delicate pink.

#### MINI MINUTES

New name tags will be issued to new members. Any member losing a tag will be expected to pay a fee of one dollar for replacement.

Barbara Good volunteered to arrange for cookies for coffee breaks for remainder of year.

Shells left from the auction will be used for the shell drawing. (Jules Hertz won the drawing)

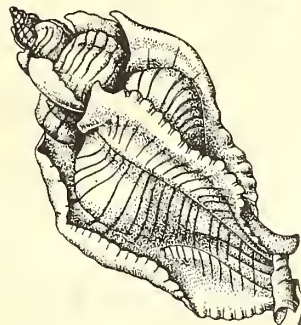




THE

# FESTIVUS

WILLIAM H. ZIEGLER  
SECRETARY  
DIVISION OF MOLLUSKS



## SAN DIEGO SHELL CLUB

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Corresponding Membership, \$2.50 - Overseas Mailing,  
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San Diego, Ca. 92109. Publications Address: Virginia  
Hanselman, 5818 Tulane St., San Diego, Ca. 92122

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Vol. II August 1971 No. 8  
\*\*\*\*\*  
\* PROGRAM, August, 19 \*  
\* Armchair Collecting - Anthony D'Attilio \*  
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### THE INTRITACALX

An Undescribed Shell Layer in Mollusks

By Anthony D'Attilio and George E. Radwin

In the course of work on the taxonomy and evolution of muricid gastropods, we have noted a peculiar feature of the shell surface. It differs from the underlying shell in being flat white in color, much softer, and, in many cases, with intricate sculpture which may not correspond to that of the underlying shell. For this surface layer we have coined the term intritacalx, a name which reflects some of the unique features of this structure: intrita - crumbly, calx - chalk.

A great deal of work has been done on the deposition and mineralogy of molluscan shells (Bggild, 1930; Clark & Wheeler, 1922; Travis, Francois, Bonar & Glimcher, 1967; Taylor & Kennedy, 1969; Kennedy, Taylor & Hall, 1969). In none of these papers, nor in any pertinent secondary references on the subject have we found any comment which might indicate an awareness of this surface layer.

A few of the malacologists who have studied the muricidae and were aware of this structure have made only cursory mention of a peculiar color, texture, or microsculpture (Harry, 1969; Keen, 1958; Kuroda,



1953; McLean and Emerson, 1970; Vokes, 1970). Some authors have commented that species of Aspella were "generally worn-looking but had bright underlying color patterns". They apparently did not realize that the specimens in question had the intritacalx partially worn away, and that the bright color pattern was in the underlying shell. Other workers were under the misapprehension that the white, limy coating was an extraneous encrustation or deposit, or due to deterioration of the shell from weathering. Although the intritacalx occurs most frequently in the Muricidae, it is also present in other gastropod and bivalve groups.

The differences between the intritacalx and underlying shell suggested that its chemical or physical nature might differ from typical molluscan shell matter. Results of X-ray diffraction tests showed that chemically, the intritacalx is made up of calcium carbonate ( $\text{CaCO}_3$ ), essentially indistinguishable from the typical molluscan shell. Physically, the intritacalx is composed of varying proportions of aragonite and calcite, the two crystalline forms of calcium carbonate found in mollusk shells. The relative amount of aragonite and calcite in the intritacalx of a given shell is in the same proportion as that of the underlying shell. The hardness of molluscan shells is principally dependent on the presence and amount of organic binding material, termed conchiolin. Presumably, the softness of the intritacalx is due to a sparsity of conchiolin (Travis & Gonsalves, 1969).

We have studied the intritacalx in four families of gastropods (Muricidae, Bursidae, Cancellariidae, Turritellidae) and two families of bivalves (Mactridae, Pholadidae). In most instances it is deposited in the form of simple axial growth striae, differing from the underlying shell only in hardness and color. Where the intritacalx is deposited in axial lamellae, it is not only softer than the underlying shell but also may not correspond to the shell sculpture underlying it. The most unusual form taken by the intritacalx is found in the genera Aspella, Typhisopsis, Tripterotyphis and related groups and in the Bursidae. In these groups it is deposited in intricate patterns which are either much exaggerated reflections of the sculpture of the shell beneath it or are completely unrelated to it. The patterns are commonly reticulate, as in Dermomurex and Bursa, but other, more complex patterns are found in other groups (eg. Aspella, Typhisopsis).

In Typhisopsis coronata (Broderip), the intritacalx is laid down as growth striae. In the most recently deposited section, the layer is continuous and uninterrupted. At a slightly earlier point in the growth of the shell, shortly behind the outer apertural lip, roughly semicircular depressions are found. These are most deeply imprinted opposite to the direction of growth and are found sparsely ... and randomly scattered over the surface. The density of these features increases towards the earlier whorls until, on the third or fourth whorl previous to this, the entire surface is covered with these depressions. The pattern may occur throughout the genus but sufficient material has not been available to investigate this possibility.

In Tripterotyphis lowei Pilsbry the intritacalx is deposited in the form of numerous scalloped or frilled laminae covering the entire shell surface. The embayments in the scalloped edges are raised from

from the surface and the projections are appressed to the shell. There are also comparatively large pits in a single row, aligned with each varix, imparting the appearance of a coarsely stitched seam to the postvarical area.

Another, more intricate type of intritacalx is found in the Panamic Aspella sp. (cf. A. pyramidalis Broderip) and in several other species of Aspella. Under low magnification there appears to be a pattern of exceedingly fine axial grooves. Under higher magnification (100X) the grooves can be seen to be lined with pits which appear as tunnel openings. These openings seem to penetrate the intritacalx at a shallow angle. The tunnels do not extend as far as the next axial groove in the direction of growth.

In Gracilimurex bakeri (Hertlein & Strong) and Takia inermis (Sowerby) the intritacalx is laid down as axial growth striae with broad, shallow, wide-spaced spiral depressions crossing them. A specimen with a partially eroded surface shows that the intritacalx erodes more noticeably in these depressed areas. When viewed cross-sectionally it is apparent that the intritacalx is undermined with tunnels following the spiral or axial sculpture. The intritacalx between the spiral furrows is continuous from its outer surface to the shell below and thus erosion in this region is not as quickly evident.

A simpler form of intritacalx is found in the genera Calotrophon and Favartia. The chalky surface here is deposited in the form of lamellae, best developed in the shoulder region. The surface is unrelated to the sculptural elements of the underlying shell or is an exaggerated reflection of microscopic sculpture of the shell.

The simplest form of intritacalx is found in Austrotrophon, Boreotrophon, Maxwellia, Poirieria, Turritella, Cancellaria and other genera. In all of these groups we have found the intritacalx occurring as a series of simple growth striae following the periodic increments of the underlying shell. In species in these and other groups we have, on many occasions found the intritacalx underneath a thin, yellow, parchment-like periostracum.

We have found that the intritacalx is of potentially great taxonomic importance in the groups in which it occurs. This is particularly true in the genera Aspella, Dermomurex, Typhisopsis and Tripterotyphis. In each of these groups the sculpture of the intritacalx is characteristic and constant. It is also of value at the species level, especially in Aspella. In this genus, species from widely separated geographical regions have often been confused and considered conspecific on the basis of worn shells. The distinctive details of the intritacalx of Aspella species are helpful in separating these.

On the basis of the foregoing we conclude that:

- 1) As the intritacalx is mineralologically similar or identical to the underlying shell, its softness is due probably to a sparsity of organic binding matter.
- 2) Since the shell is deposited by the mantle, it is not unreasonable to assume that the intritacalx is also laid down by the mantle.



3) We believe that the intritacalx is deposited synchronously with the underlying shell, an assumption strengthened by its deposition, in many cases, immediately under a periostracum.

The intricacy of pattern and structure (as in those species whose intritacalx is undermined with tunnels) may prove of interest in determining the possible functional morphology of this chalky surface layer.

We would like to express our appreciation to Dr. Richard W. Berry, Dept. of Geology, San Diego State College for assistance in X-ray diffraction analysis and for other helpful suggestions. We also thank Mr. Arnold Ross, San Diego Museum of Natural History and Dr. William K. Emerson, the American Museum of Natural History for reading and criticizing drafts of this paper.

### THE PERPLICATOR

At the WSM meeting a film was presented by Dr. Abbott, starring Mickey Rooney and John E. du Pont, which showed some of the frustrations and difficulties Mr. du Pont encountered in trying to find a Voluta perplicata while on an expedition to Australia. The expedition was not fruitful and there are still only three known specimens. A letter was received at Disney studios from Aggie Grey's Curio Shop in Apia, Western Samoa. The following is the text of the letter.

Aggies Hotel  
31 January 1970

Docmentary Awards Committee  
Hollywood Cinema Academy  
Los Angeles, California, USA

Dear Sirs:

We understand that you were shown recently a film entitled THE SEARCH FOR THE PERPLICATER, in which some marine biologists and divers spent several months combing the Great Barrier Reef off the coast of Australia, seeking a certain shell of which there are only three known specimens in the world. Their search, unfortunately for them, did not add to the known number.

This is to advise you that in our Gift and Curio Shop, we have eight gross of these perplicater shells in stock, selling for \$1.75 apiece, (slightly higher in Canada), and that we will be glad to take orders by mail. We also sell canned plankton, electric eels of both 110 and 220 volts capacity, abalone-flavored yogurt, Coconut Cola, and the Polynesian edition of Readers Digest.

With high esteem for the important work of your committee, and assurances that we will be glad to serve you any time you are in the Apia area, I remain,

Yours respectfully,

Charles M. Aggie

## AQUARIUM OBSERVATION

Nola Michel

I found something quite interesting in my aquarium the other day. First the circumstances. The aquarium is about 40 gal. and contains some long-time residents -- all had been there for months -- no new specimens had been added. I had just cleaned said tank, rinsing all the long-resident sand with fresh water. I then returned the sand and residents to the tank with clean salt water obtained from the salt water spigot at Scripps Institute of Oceanography. Less than two weeks later I observed live Caecum on the plexiglas sides of the tank. I 'collected' three specimens and observed them closely, leaving at least three more specimens in the tank. I have not seen them lately -- perhaps they are in the sand. Oops, just looked in the tank, one is hanging on the surface tension of the water, near the side of the tank. Where did they come from? My guess would be the water.

There are good illustrations of Caecum in the Golden Field Guide, Seashells of North America, pg. 87. I found the animal in this specimen to be very white with the operculum almost black. The animal when extended from the shell was very active, flipping the whole shell as though it were a tail.

NOTE ON THE OCCURENCE OF BITTIUM QUADRIFILATUM (Carpenter 1864)  
IN MISSION BAY

Susan and Martin Bishop

Bittium quadrifilatum, a gastropod which has been recorded from San Pedro, California, to Santa Maria Bay in southern Baja California, was recorded from San Diego in 1885 by Orcutt. This species is still abundant in Mission Bay. We have found it in great numbers in some areas of the bay where the lack of strong water currents cause the bottom to be somewhat muddy, with growths of green algae (Enteromorpha and Ulva). This Bittium lives chiefly around low tide level and beyond, partially buried in the sediment. It is not easily visible unless a sample of sand is sieved, where upon densities of three to five per square foot of surface can be found. All sizes from adult to very young juveniles were observed in March 1971. The juveniles in particular were also found crawling on the algae and eel grass. Many adults had clusters of small yellow stalked egg capsules attached to the shell. The adult snails have a shell length of around 12mm. The visible parts of the animal are white, and the shell is dark brown with beaded sculpture. The specific name refers to the presence of four spiral cords per whorl which are visible on the earlier whorls.



## BOOK NOTES

By Carole M. Hertz

BRITISH BIVALVE SEASHELLS by Norman Tebbie is a most welcome addition to our Club library and a must for those interested in bivalves. Published in 1966 by the British Museum (Natural History), this compact book is of value to all collectors and provides the amateur with a short course in the Pelecypoda.

The book is much more than a collection of pretty pictures (which it has--12 plates, eight in color). This reviewer finds the text superior. It is concisely written and the information given seems complete including animal habitat, range and in some cases special references. The shell descriptions are easily understood and profusely illustrated with explanatory black and white drawings. A Key to the superfamilies (illustrated) is given as are Keys within the separate families.

Our thanks go to our members, Susan and Martin Bishop both for bringing this book to our attention and for donating a copy to our library.

Just received this month, A MANUAL FOR THE STUDY OF MEIOFAUNA, \*by Neil C. Hulings and John S. Gray, Smithsonian Contributions to Zoology, Number 78, 1971.

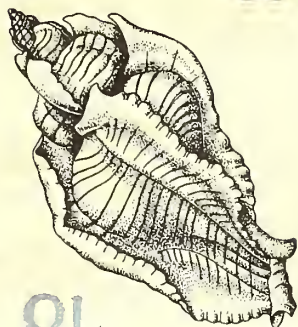
\* "...coined by Mare in 1942 to describe metazoans (and foraminifera) too small to be retained on the lmm sieves used by marine biologists.."

## NEW MEMBERS

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\* PROGRAM, September, 16 \*  
\* RECENT SLIDES OF NUDIBRANCHS - David Mulliner \*  
\* SLIDES OF WESTERN SOCIETY OF MALACOLOGIST'S MEETING-Clifton Martin\*  
\* \*  
\* PUBLICATIONS ADDRESS: Virginia Hanselman, 5818 Tulane St. \*  
\* San Diego, Calif. 92122 \*  
\*\*\*\*\*

### ARMCHAIR COLLECTING

For the past two years Mr. Anthony D'Attilio has been working with Dr. George Radwin, Curator of Marine Invertebrates, at the San Diego Museum of Natural History - but for thirty-five years he has been collecting, studying, writing about - and depicting - shells. Mr. D'Attilio was the speaker at our August meeting, and, seated in an armchair (an appreciated bit of theater) he related many details of his experiences as an "armchair collector".

Shell collecting, as a hobby - he told us - is a comparatively recent development. However, in England in the early seventeenth century, people of wealth and leisure displayed shells as items of interest in their "curiosity cabinets". Then, as now, they tried to acquire as many and varied specimens as possible - but they were only "conversation pieces".

Mr. D'Attilio's collecting began in 1936 with a box of shells sent to him by wife, Rose, from Florida. They were small shells and so interested him that he immediately joined her in Florida where he obtained many more before their return to New York.

The only book about shells that was available at the time was Walter Webb's Handbook for Shell Collectors. The American Museum of Natural History was several blocks from his home and he would go there



at every opportunity to look at the wonderful shell collection. He sometimes helped Miss Mack in the Museum's Bookshop by labelling some of the shells she acquired for sale in the shop. In the meantime - over a period of years - through his purchases from dealers, he had become proficient in judging the commercial value of shells (those in demand by collectors.)

Early in 1939 Miss Mack asked him one day if he would like to help a dealer who was to bring over a large collection from England. Mr. Martin Erhman, the dealer, was a specialist in minerals but needed help to familiarize himself with shells. Introduced to Mr. Erhman, Mr. D'Attilio was told something about the Calvert Collection. That something was enough to keep him in excited anticipation of the collection's arrival.

When the collection finally arrived Mr. Erhman tried, unsuccessfully, to sell it to the city of Baltimore. The John Calvert who had brought the collection together was supposed to be related to Lord Baltimore. He was a mining engineer from Australia and had amassed a large fortune, a nice portion of which he had spent in acquiring shells. He had outfitted a yacht, the "Scout", for a shell collecting trip to the South Seas, and shells from this expedition, as well as a number of collections purchased at auctions, were in this enormous collection.

The collection required seven van-loads to transport it to the International Building in Radio City, where it was stored in a sub-basement. Most of the shells, except those stored in cabinets, were packed in 300 large cases. When, after several attempts, Mr. Erhman failed to sell the collection as a whole, he decided to dispose of it piecemeal. This was when Mr. D'Attilio was asked to help. He consented to give his time and advice - and other necessary help - for the privilege of selecting shells for himself. Any collector would agree that he made a fine bargain. One could not call this "arm chair collecting" when considering all the work involved in handling this vast collection, as a succession of collectors picked the shells they wanted. Until 1942 Mr. D'Attilio assisted with the Calvert Collection following it to a new owner, still having the privilege of choosing shells for himself.

Through other shell collectors Mr. D'Attilio made contacts with dealers across the world and after the war ended and trade channels were open, he began trading for shells. Kinoshita and Terimachi, of Japan, and the late Pedro De Mesa of the Phillipines were on his trading list. It was, indeed, a trading list - he even traded shoes and clothing for shells.

There came a time when just adding more shells to his collection was not enough. In 1960, Dr. Wm. K. Emerson of the American Museum helped him in the scientific aspects of shells, and was especially helpful in the study undertaken by Mr. D'Attilio of the radula and shell characteristics of the Muricidae. Mr. Azuma, of Japan, was also helpful with this subject, exchanging views and information. Mr. D'Attilio spoke also of the help he has received, since coming to San Diego, from Dr. Dwight Taylor of the Museum of Natural History. When this more serious work became his interest, he contacted deep-water divers of the armed forces in the Phillipines. One such diver, Joe Bibbey, obtained specimens for him.

In San Diego, he has worked with Dr. George Radwin on radluas. With a radula on a slide, he peers through a microscope and makes finely detailed drawings. Together, they have made a study of a hitherto unnoted physical detail of mollusks, chiefly in the Muricidae - named by them, the intritacalx.

Mr. D'Attilio emphasized that all observations made by individuals - and noted - are important. However inconsequential they may seem they add to the general knowledge and may even lead to new concepts.

Slides of many of the shells he has acquired by trading were shown. A number of the shells was exhibited. B.B.

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Anthony D'Attilio is an artist, in glass, of international reputation. An outstanding example of his beautiful work may be seen in the Capitol Building at Washington, D.C.

He enjoys, particularly, the execution of nature studies and has illustrated nature books for children. Ed.

#### IN MEMORIAM

This last month we have lost two of our old and dear members, Dorothy Brown and Helen Thompson.

Dorothy was a member of our Club for over six years and also belonged to the Southern California Conchological Society. She was a long time collector and loved the Sea of Cortez.

We will all miss Helen's effervescence and generosity. She was a pioneer collector in Mexico and Florida and, with her husband, an inveterate traveler.

#### ANNOUNCEMENT OF A NEW COLLECTING AREA

On Monday, August 30, an Ecological Reserve was dedicated at Goldfish Point in La Jolla. One and one half miles of shoreline are now protected from Goldfish Point to the boundary of U.C.S.D., 5,977 acres. There is no collecting of ANY kind, either shore or deep water.

The idea originated with two divers, James Stewart, chief diver for the Scripps Institution of Oceanography and Connie Limbaugh, the late diver-photographer who died in 1960 in France while exploring an underwater cave. Dr. W.A. Nierenberg, who was chairman of the park committee said that now there can be hope that the abalone and lobster populations might make a comeback in the reserve area.



# "PAN FRIED"

By John Phillips

Probably one of the finest delicacies to come out of the sea is pan fried San Diego Scallop (Pecten diegensis Dall, 1898); unfortunately, this is a gourmet's delight which very few individuals have sampled, and I sincerely wish that I could personally convey the savory flavor of this mollusk to every food-loving individual in the world. I have the fortune (?) of being a six year veteran of the commercial abalone diving business, and I have spent countless hours on the bottom of our Southern California waters in search of our tasty Haliotis and other desirable seashells, one of these being the elusive Pecten diegensis.

Pecten diegensis has long been on the very rare, rare, or scarce list, and I will concur with the writings of any conchologist or malacologist who claims that this is one of the harder-to-obtain Southern California seashells. I searched long and hard before I found my first specimen in 105 feet of water off Coho Anchorage, which is located approximately 2 miles southeast of Point Concepcion Lighthouse.

I generally collect Pecten diegensis in depths varying between 45 (rarely) feet and 140 feet; however, the larger concentrations of this species seem to centralize themselves in the deeper waters over 80 feet. Many people seem to have the feeling that Pectens can only be collected on sandy or silty bottoms; this might hold true for many species of Pecten or Chlamys, but I find the diegensis living happily on a variety of bottoms (ie. silt or mud with rock rubble, coarse sand pockets in rock reef areas, very seldom in strictly sand or silt bottoms, and quite often I find them laying amongst large rocks or boulders with no sand or silt anywhere nearby). It seems to be a fairly gregarious species, in that I generally manage to locate more than one specimen at a time in the same, general area. I once collected eight fully adult shells (3" up) in a ten foot radius, and I suspect that there were probably more hiding beneath the silt or sand in the same spot.

I have found that the best way to spot Pecten diegensis is to swim very slowly approximately 10 or 15 feet off the ocean floor, water visibility permitting of course; the Scallops do not seem to spot a diver as quickly this way, whereas if you blunder along the bottom this clever mollusk will spot you nine times out of ten and will accordingly take the necessary precautions against the would-be hands of the collector. Generally speaking, Pecten diegensis will be found partially or completely buried in the sand or silt, unless you are lucky enough to locate one that has swam onto a rock reef and is lying there fully unprotected. When they are comfortably nestled in the silt or sand they will then execute their only precaution against foes, which is camouflage; they are absolute masters at this, and even the trained eye of a seasoned veteran of Pecten collecting will more than often not distinguish the faintly visible silhouette of this shell as it lurks beneath the bottom.

When the Pectens are at ease they slightly open the two valves and protrude their many eyes along the outer edge of the shell. I

have no idea what they are looking for with all those lovely eyes, and it is indeed a very strange experience to catch a colony of Pecten diegensis "napping"; like so many grains of iridescent sand amongst all the other grains of sand on the ocean floor (this is how their eyes appear). Whenever the Pecten sense danger approaching his domain he immediately draws in his eyes, closes his shell tightly, and somehow causes a small trickle of silt or sand to settle along the outer, once-visible perimeters of his shell, thus sealing him off from the "outside" world and all its dangers. He has even managed to support and encourage the growth of a colony of Algae on the flattened, top valve of his shell, and this can very easily be mistaken for common bottom growth. Actually it gives him the appearance of a tiny, scallop-shaped "forest", standing out in relief against the drab-colored backdrop of a rock reef or a sandy/silty bottom. Once you, the diver, have learned to spot this little forest the rest is comparatively easy, and you are well on your way to your very first meal of "pan-fried" San Diego Scallop.

## THE WEST COAST SHELL SHOW AND AUCTION AT SANTA BARBARA

By Clifton L. Martin

The Santa Barbara Malacological Society surely deserves the congratulations and support of all shell collectors living on the west coast for the outstanding quality of the West Coast Shell Show and Auction they present each year.

As one who has not missed any of these fine events, since the first one in 1968, I can truthfully say that they get better with each passing year. This year's show was held July 31st and August 1st and was the best of all. Besides getting to see a superb shell show and perhaps pick up a few specimens at the auction it is always good to meet again with friends in Santa Barbara and from elsewhere.

This year four of us, including my sister Anna Morris, Elizabeth Baker, Clifford and I attended on the last day, since the auction is always held then and we hoped to get a few shells in the bidding. Although the trip to Santa Barbara and back may seem a bit long for one day it was very greatly enjoyed by all of us.

To those who have not attended any of these events, the Veterans Memorial Building, where it is held, is on Cabrillo Boulevard facing the ocean. It is an ideal location. The shell show is held in the main hall of the building and the many exhibits are displayed on several rows of tables in the center of the hall. The outer perimeter of the hall is taken up with booths and displays of shell dealers. The auction is held in a smaller hall adjoining the main hall so both events may be in progress at the same time without either interfering with the other.

There was an exceptionally high quality to all of the exhibits this year and many of the shells displayed were species I had never seen before. The Shell of the Show award was won by David Thomas for a superb specimen of Conus bengalensis Okutani. This was our first



view of this extremely rare and fine species which was recently described by Dr. Takashi Okutani. The shell is evidently closely related to Conus gloriamaris but differs from it in several ways. There were two specimens of Conus bengalensis at the show, the other specimen being for sale in one of the booths. These two specimens averaged a bit larger than the specimens of Conus gloriamaris I have seen. The new species has a higher, more acute spire than Conus gloriamaris and is a bit more slender in form. The color pattern is also different, being in zones of dark and light patterns rather than uniform as in Conus gloriamaris. Incidentally, the specimen that was for sale could be purchased for \$2500.00. The dealer who had it also had a superb, live collected specimen of the volute, Festilyria festiva (Lamarck), one of the world's rarest shells. Although we were unable to measure it this specimen appeared to be between four and five inches in length and was complete with operculum.

Among the many fine displays was one by Lawrence Thomas, of Morro Bay, showing some of the world's rarest shells, as well as some of the most beautiful. This display won the du Pont Trophy and contained such rarities as Entemnotrochus rumphii, Perotrochus teramachii, Conus gloriamaris, Cypraea contraria, Murex alabaster and many others, all of exceptionally fine quality. It would be impossible to describe all of the many exhibits but I must add that there was also a fine display of Conus by a Florida collector and an especially beautiful display of Cypraea by Betty Phillips, of Santa Barbara.

Although we attended a part of the auction we did not get many shells. However, we got a nice specimen of Phalium wyvillei (Watson) and a few species of Conus which we did not have in our collection although none of them are extremely rare.

From one of the dealers booths we were able to get a good, though dead collected, Altivasum flindersi, a shell we had been trying to get for several years. Also, a trip to Santa Barbara without visiting the establishment of Bob McMillen and John Philipps would be unthinkable, especially since their shop is only two blocks west of the Veterans Memorial Building and is always loaded with goodies.

Altogether it was a very enjoyable occasion, made doubly so by all of the loot we brought home.

## BOOK NOTES

Carole M. Hertz

The Club has just purchased a copy of Tom Rice's new book, "Marine Shells of the Pacific Northwest", published by Ellison Industries, Inc. and costing \$2.50

This book covers the "the more common larger.." shell species from northern California to and including British Columbia, each shell illustrated in beautiful color. The color plates are the highlights of the book. Each shell is shown in at least two views and in cases

of variability such as in Mopalia ciliata, six color variations are illustrated. The photography is successful for all but the small shells which lack the definition necessary to aid in identification.

The species are arranged by families from the primitive to the developed with a short descriptive text accompanying the plates noting range, habitat and distinguishing characteristics.

This writer believes the book to be a most useful addition to our library and a valuable aid to those who collect along the Pacific Coast--certainly a bargain!

# NEW MEMBERS

Mrs. Ruth Oberg  
2579 Arnott St.  
San Diego, Calif. 92110  
276-6659

Wm. L. Willie, Jr.  
1405 McFaddin  
Beaumont, Tex. 77701

# CHANGE OF ADDRESS

Martin and Susan Bishop  
% Dr. Martin J. Bishop  
Sidney Sussex College  
Cambridge, CB2-3HU  
England

\* \* \* \* \*

COMING OCTOBER 9th our Mexician Fiesta at the  
home of David Mulliner

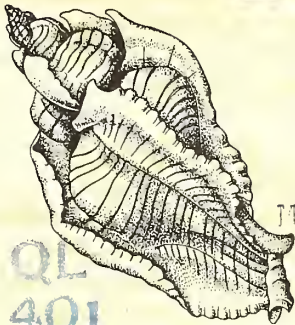
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## SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968

Museum of Natural History - Third Thursday - 7:30 P.M.

President: Roland Taylor  
Vice President: Clifton Martin  
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Vol. II

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No. 10

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\*Our Mexican Fiesta, at home of David and Margaret Mulliner, Oct. 9 \*  
\*No Regular Meeting \*  
\*November Meeting - David Leighton will be speaker on Mariculture of \*  
\* Abalone - also, ELECTION OF OFFICERS. \*  
\*Publications: Virginia Hanselman, 5818 Tulane St., San Diego, Ca. 92122 \*  
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### PROGRAM - SEPTEMBER, 16

David Mulliner's slide-showing of opisthobranchs and nudibranchs - from the Galapagos, the Gulf of California, the San Diego area and Pismo Beach - was received with keen, even vocal, appreciation. These exquisite but fragile creatures, in their living rainbow of color and multiple variety of form and size, are always fascinating slide subjects.

Many types were shown; from Berthellina engeli Gardiner, 1936, of vivid color (apricot to orange) but known as "The Blob"; to Tridachiella diomedea - (Bergh, 1894), gray to pale yellow, with a lovely jeweled frill running the length of its body in six folds, the ruffle repeated around its perimeter; to Pleurobranchus (Pleurobranchus) areolatus (Morch, 1863), in many colors - resembling a millefleur paperweight - and adding a lace edge to its perimeter. (This illustrating wide variations.)

To many present, the "Bivalve gastropod", Berthellina (Edenttellina) chloris Dall, 1918, was of tremendous interest. This animal is a trim little creature - 6 to 9 mm of vivid green; seeming almost transparent, its little loosely-hinged shell saddling its back. It was photographed on its feeding ground, bright green Caulerpa racemosa, from which it gets its color.

On the Ameripagos Expedition to the Galápagos, twenty-five species were taken, six of which were undescribed, so far as known. Some specimens shown from this area were: Dolabrifera dolabrifera (Bang, 1828), Umbraculum ovale (Carpenter, 1856), Lobiger souverbii (Fischer, 1856), Berthellina (Edenttellina) chloris Dall, 1918, Berthellina engeli (Gardiner, 1936), Pleurobranchus (Pleurobranchus) areolatus (Mörch, 1863) and Chromodoris sedna (Marcus and Marcus 1967).

From the Gulf of California, among others, were shown Denorodoris krebssii (Bergh, 1879), Hypselodoris californienses (Bergh, 1879), Dendronotus nanus Marcus and Marcus, 1967 and Chromodoris banksibanksi Farmer, 1963. From the San Diego area were Flabellinopsis iodinea (Cooper, 1863), Hermisenda crassicornis (Eschscholtz in Rathke 1831), Diaulula sandie-gensis (Cooper, 1863), Anisodoris nobilis MacFarland, 1906, and Tritonia festiva (Stearns, 1873).

Pismo Beach was represented by Polycera atra MacFarland, 1905, Dendronotus frondosus (Ascanius, 1774), Precuthonia Divae Marcus, 1961 and Catriona aurantia (Alder and Hancock, 1842).

Mr. Clifton Martin showed slides of the Western Society of Malacologist's meeting at Asilomar, held June 16-19 this year. Many well known personalities in the field of Malacology were present and photographed - at this always enjoyable and instructive annual convention.

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We wish to make a correction: Last month's issue carried a short article about a Completely Restricted collecting area, but entitled "Announcement of a New Collecting Area". It should have read, "Announcement of a New Un-collecting Area".

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## FEEDING HABITS IN PROSOBRANCH GASTROPODS

By Dr. George Radwin

For those of us who "live to eat" instead of "eating to live" it is reassuring to hear that snails have, just as we have, made eating a "habit". Here, however, the resemblance generally ends. It is unlikely that there is any record of a gastropod overeating. This is probably just as well as the mental picture of a snail dosing itself with "peptobismol" is too ludicrous to accept.

The Gastropoda is a large group, diverse in the morphology, physiology and ecology of its representatives forms. As in most, large animal groups certain "standard" feeding habits are practiced by many of its forms. With the exception of unusually specialized types of feeding, most trends in feeding habits roughly follow phyletic lines (i.e. can be correlated with relationships of the animal). Within the Prosobranchia these are generally thought to fall into three groups, the Archaeogastropoda (Pleurotomariidae -- Neritidae), the Mesogastropoda (Littorinidae - Ficidae) and the Neogastropoda (Muricidae -- Conidae).

Most of the most primitive gastropods (Archaeogastropoda) are grazers and browsers, scraping food from the substratum. In most cases this food consists of particles of fragments of plants. Abalones



crop macroscopic (i.e. visible to the naked eye) algae. Most trochids (Calliostoma, Tegula, etc.) and most true limpets (Acmaeidae) graze on mats of microscopic algae or on large kelp-like algal growths. Most, if not all of you have seen fronds of our "feather-boa" kelp with holes "bored" in them. Indeed some appear to bear some relationships to swiss (albeit domestic variety) cheese. The feather-boa limpet, found only on this plant, lives its life on a "pure food" substrate, eating as it moves.

A few of these primitive gastropods have turned to grazing on plant-like types of animals. Members of the Fissurellidae (keyhole) limpets are known to graze on sponges. This is not simply a resting site as some people have contended. Sponge spicules found in these snails stomachs are sufficient evidence of feeding activity on sponges.

Many supposedly more "advanced" gastropod forms (Mesogastropoda), still quite primitive compared to the group as a whole, have very generalized feeding organs (radula, etc.) well-equipped to "sweep" or "comb" the bottom to obtain detritus (non-living organic matter) as their food. Toward the middle of the mesogastropoda, however, certain groups have diverged from the traditional type of feeding and specialized feeding styles have evolved.

The Vermetidae, that group of strange snails whose shells, after a brief period of normal coiling literally "come unglued" have an ingenious method of feeding. The animal produces a fine net made of mucus strands. It unfurls the net and suspends it in the water current. After a suitable period of time the net is hauled in, using the radula as a toothed windlass, thus retrieving the non-living particles and tiny living organisms trapped in it.

Snails in several groups have specialized in feeding on coelenterates. In the Epitoniidae, the ordinary radular (feeding) apparatus is divided in half, each half supplied with numerous, similar elongate hooks. The resemblance of this situation to a log-finishing apparatus, dual cutters, one on each side of the log-way, is difficult to avoid. Apparently, in some cases, the tentacle of the anemone, stinging cells notwithstanding, are inserted between the two "buss-saws" and are quickly "finished."

Another related group, the Janthinidae, or pelagic purple snails, have a similar feeding habit and apparatus. At least the radular teeth are similar. The planktonic (free-floating) existence of members of this group dictates a slightly different coelenterate prey. In the mid-ocean, vast numbers of siphonophores (Portuguese man-o-war, by-the-wind-sailors, etc.) may be found, and around and on them we may find the purple snail eating his fill.

Nearby, from an evolutionary standpoint, are a number of groups of gastropods whose members have carried the "chow-hound" image to its logical extreme. These groups range in feeding habits from the Eulimidae (Balcis, Melanella, Eulima, Niso), ectoparasites with no radula and an apparently suctorial feeding habit on other mollusks, to the Styliiferidae, whose members are partially to completely endoparasitic on echinoderms.



The family Entoconchidae comprises a number of worm-like or bag-like internal parasites of mollusks whose only apparent tie to the mollusca is their passage in the course of their life cycle through a typical molluscan veliger larval stage.

A somewhat smaller deviation from the "typical" mesogastropod detritus-feeding habit is found in the Capulidae. These epizoic animals are always found on bivalves and almost always in the region around the hinge-line. They are especially "fond" of scallops, Limas and other relatives. In these species a moderate to large gap at one corner of the hinge-line allows some mucus to ooze out. It is on the mucus that the capulids feed.

The family Naticidae is the most primitive one in which the shell of the prey (bivalve, gastropod, etc.) is bored. Using a modified radula and an apparently weakly acidic salivary secretion, the shell of the prey is perforated and the flesh inside is rasped away.

The Family Cypraeidae has always been assumed to contain only herbivores. This notion is hard to dispose of. Apparently, the majority of the species in this group are still considered herbivores. Nevertheless, several reports, including one recently by Carole Hertz, indicating a carnivorous habit by Cypraea spadicea, have changed some people's ideas on the uniformity of potential prey for cowries. Somewhat unexpectedly other forms, supposedly related to the cypraeids on the basis of shell morphology (Eratoidae, Amphiperatidae) and called by many collectors "allied cypraea" are not vegetarians at all but seem to prefer "steak" (with or without potatoes). The amphiperatids (Neosimnia, Volva, Cyphoma) seem to subsist on "soft corals." In the new world these are small forms living on relatively small sea whips, sea fans, etc. and absorbing the pigmentation of the coral by ingesting and assimilating the calcareous spicules making up the semi-rigid stalk of these colonial coelenterates. In the old world several larger amphiperatids feed on immense, fleshy heads of alcyonarian (soft) corals. We have no direct evidence of the feeding habits of eastern Pacific eratoids but the type species of the genus Trivia (T. europaea) is known to feed, in British waters, on colonial ascidians (related to sea squirts).

Members of the Tonnidae are known to feed by boring on other shelled mollusks and utilize, in addition to the radula, a rather strongly acid secretion in measurable amounts. It is apparently primarily hydrochloric acid.

The cassidid snails feed on sea urchins - what would appear to us to be a most undigestible source of dinner. The agility of these large, heavy snails is startling and undoubtedly essential in avoiding or overriding the sea urchin's spines while boring through its test (shell).

The mode of feeding in muricid gastropods is probably no secret to any of you but for the few who may not have heard: The Muricidae is another "boring" gastropod group which, in spite of this damning description contains some very interesting forms. In general, muricid gastropods feed by alternately applying the radula and an accessory boring organ (ABO) to the drill-site. The secretion of the ABO is

apparently one of those interesting chemicals, called a chelating agent that occupies certain sites on other molecules (such as calcium carbonate) thus weakening them structurally. The radula then erodes this partially softened material.

Massariid and melongenid gastropods are scavengers using their radula to tear off chunks of decaying animal or plant matter. Buccinids are said to produce a paralytic chemical agent that causes bivalves and gastropods to relax and expose their bodies.

A family closely related to the Muricidae and particularly the Thaididae is the Coralliophilidae (Coralliophila, Latiaxis). Members of this group differ from the two above related groups in their lack of a radula. This is undoubtedly related to their close association with reef type corals. These animals apparently feed suctorially on these corals, although at least one eastern Pacific species is known to feed on colonial anemones.

Very little is known about feeding in such families as Olividae, Marginellidae, Harpidae, Vasidae, Cancellariidae, Volutidae and Mitridae. The assumption is that these sand dwellers are primarily worm-feeders.

The Toxoglossate groups are also thought to be primarily vermivorous. In some exceptional cases other things are eaten (some cones feed on fishes and others on mollusks). As most of you know, toxoglossate (arrow-tongue) forms secure their food by "harpooning" them and thus injecting a paralytic poison.

This list of feeding habits and food preferences does not express all that there is to say about prosobranch feeding. It does cover some of the more interesting modes of feeding.

## COLLECTING ON THE ROCKY SHORE IN ENGLAND

By Susan and Martin Bishop

Not many members of the San Diego Shell Club will ever have the chance to collect in England, but for those who may be tempted, here is some information.

The finest areas for rocky shore collecting in Britain are Devon, Cornwall, Wales and Scotland, where the coastline is swept by the clean waters of the Atlantic. Those people who are accustomed to collecting in southern California or West Mexico may be disappointed by the smaller number of species present in these cooler waters, but nevertheless there are some very interesting and beautiful species to be found.

On rocks in the splash zone crevices shelter the small winkle, Littoriana neritoides. Further down, the ubiquitous Patella vulgata a large limpet, makes its appearance with another winkle, L. littorea. This large winkle is still relished as a delicacy at many seaside towns. Where there are barnacles or beds of Mytilus edulis, Nucella lapillus (which resembles Thais emarginata of the Southern California coast) is common.



As one descends to the middle tide level two more winkles, L. saxatilis and the smooth flattened L. littoralis appear. The latter is extremely variable with respect to colour and may be white, lemon yellow, orange or dark brown, plain or banded with purple, and occasionally marked with intricate zigzag patterns. Hiding beneath brown algae two top shells are commonly found: Gibbula cineraria and umbilicalis, both yellowish-grey with purple mottlings. Patella intermedia, a limpet with orange rays also lives in this zone.

The lowest tidal zone of the big brown kelp is the territory of Calliostoma zizyphinum, a species which vies with C. annulatum of this coast in its superb colouration. The kelp also supports a small rounded limpet, Patina pellucida. This delicate shell is usually marked with two or more intense blue rays.

For those willing to search a little harder, in many areas the dainty Emarginula reticulata and Diodora apertura will be found under stones at low tide. Velutina velutina, Trivia artica and monarcha, and the elegant large wentletrap Clathrus clathrus may sometimes be found at low tide, as may Ocenebra erinacea, our only native intertidal muricid and the type of the genus.

There are of course, many other species which occur on the rocky shore, especially minute and sublittoral species, but I hope this introduction may be helpful in giving a general picture of the more common species and where they occur.

Ed. note. Susan and Martin have returned to Cambridge, England after their year's stay in San Diego. We're looking forward to further interesting articles from England.

## SILVER LINING

By Twila Bratcher

It could have been a miserable day or at least a very depressing one. We were stranded in a dinghy in the rain. The Ecuadorian fishing boat, Cristo Rey, had left my diving buddy, Ellen Brennan, and myself (with a diving hookah and an extra can of gasoline) in a small dinghy powered by one oar for sculling. We were to have several hours of diving at this location at James Bay, in the Galapagos Islands, before other members of the Ameripagos Expedition aboard the Cristo Rey picked us up before sundown.

The hookah engine threw a rod during the first five minutes of diving, and after our struggle to start the motor before we realized the trouble, we were too tired to free dive. We sat in the boat, and it began to sprinkle. Then it poured. Even though we were almost on the equator it was not warm. Our wet suit jackets and jeans for diving kept us from being too uncomfortable but we sat, huddled, trying not to think of the hours we must wait to be picked up. Sheer perpendicular cliffs eliminated the possibility of even trying to scull to shore.

The rain came down like small silver lances hurled at the water, denting the surface as it struck. I said, "Look at the dimples the rain makes on the surface. Let's get in and see what it looks like underneath." We dropped overboard into water warmer than the rain and saw it had a completely different look from underneath. It was like a sheet of silvery satin dented by pellets which did not penetrate. I remembered having seen a picture of a fish in the Indo-Pacific area with two sets of eyes...one for seeing above the surface and one underneath. I wondered what it would be like seeing both views at the same time. We found out - by placing our heads on the side, breathing through the snorkle, and placing our face masks so that one eye was above the surface and one below. It was fascinating!

Before entering the water we were watching three blue-footed bobbies on an outcropping of lava rock about three feet above the water. To our surprise they were facing into the rain, as was a pelican a short distance away. All were hunched and somewhat bedraggled, reminding us of a group of humans, without umbrellas, waiting for a bus. We swam close enough to have touched them but they ignored us and remained hunched and peering into the rain for the bus that did not come.

A black heron with orange eyes - and legs so short it did not seem to belong to the heron family at all - landed on the rocks a short distance away. It seemed oblivious of the rain, which by now had diminished in intensity. It industriously looked for small crustaceans among the rocks. Swimming over to look at the heron took us into a shallow cove. Below, in about eight feet of water, a large tropical spiny lobster, more colorful than the California species, ambled so unconcernedly we were sure it knew we were wearing neither weight belt nor gloves. We were glad we had left them in the dinghy because it was a pleasure to watch the big lobster moving in the open unafraid.

From lobster watching we turned to fish watching. Following a beautiful golden fish - possibly a golden grouper - took us near the perpendicular cliffs which we could approach between series of breakers. There Ellen found two lovely specimens of Neorapana Grandis (Sowerby, 1835) near the water line. That made the dive worthwhile. Not long afterward I drifted over to a large rock which rose above the surface. A bump on it turned out to be the largest Thais planospira (Lamarck, 1822) any of us had ever seen. Who needs a weight belt and scuba equipment?

When we looked up to see the Cristo Rey approaching, we could hardly believe so much time had flown. We had to swim like mad to reach the dinghy and haul in our anchor by the time the Cristo Rey arrived. Then we noticed the rain had stopped sometime earlier. It had been a lovely day!



(to those who have left us)

TO YOU, our dear friends  
And wonderful companions  
Whose gracious presence  
And kindly understanding  
Throughout the years  
Enhanced the pleasure of our days;  
We say, with much sincerity,  
That you are being missed,  
By all of us who remain,  
As we cherish cheerful memories  
Of your now interrupted journey here.

It is though our wish and prayer  
That sometime, somewhere, in a new,  
Happier and more care free life,  
We may meet again  
And have the true joy  
Of together treading golden strands,  
Or finding wondrous shells  
With undreamed of beauty and symmetry,  
And in renewing  
Our many fine friendships

And so to YOU we do not say "goodbye"  
But just a hopeful "Au Revoir."

E.C. Roworth  
9-29-71

#### BOOK NOTES

By Jules Hertz

The long awaited second edition of SEA SHELLS OF TROPICAL WEST AMERICA by Dr. A. Myra Keen with the assistance of Dr. James McLean became available early in September. It was published by Stanford University Press, and is priced at \$29.50. The San Diego Shell Club Library has purchased a copy which is already in circulation. A review of this greatly expanded work is scheduled for the next issue of the Festivus.

#### NEW MEMBERS

Mr. Harold C. Kinney  
2805 Bibb St.  
Shreveport, La. 71108

SAIPAN SHELL CLUB  
% Mrs. Larry Brundy  
Box 17 Capitol Hill  
Saipan, Mariana Islands  
96950

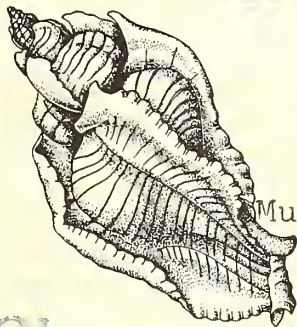




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THE

# FESTIVUS



## SAN DIEGO SHELL CLUB

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Museum of Natural History - Third Thursday - 7:30 P.M.

President: Roland Taylor  
Vice President: Clifton Martin  
Recording Secretary: Clifford Martin  
Corresponding Secretary: Virginia Hanselman  
Treasurer: Margaret Mulliner  
Editor: Blanche Brewer

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Vol. II

November 1971

No. 11

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\*PROGRAM, NOVEMBER 18: \*  
\* Mr. David Leighton will speak on Mariculture of Abalone in \*  
\* classroom, next to auditorium. \*  
\*The CHRISTMAS PARTY will be at C.P.O. Club, Miramar, Thursday, \*  
\* December 16. Dinner (steak or prime rib) will be \$4.00 and \*  
\* reservations should be in by Dec. 10. Please state choice of \*  
\* food. Checks payable to San Diego Shell Club, 5283 Vickie Drive, \*  
\* San Diego, Calif. 92109 \*  
\* \*  
\*There will not be a December issue of the Festivus. \*  
\*\*\*\*\*

"Helpful Hints on Collecting and Cleaning Pteropurpura macropterus and  
Pteropurpura vokesae" by John Phillips  
Island Specimens  
320 West Cabrillo Blvd.,  
Santa Barbara, Calif. 93101

Having been a dyed-in-the-wool Murex lover for almost 15 years, I was naturally very keen on discovering the whereabouts of our local goodies when I began diving commercially off Santa Barbara about seven years ago. The following helpful hints apply only to personal observations made by myself in the Santa Barbara and Point Concepcion areas. In short, you cannot always judge one by looking at the other, and my observations might prove faulty in other areas where Pteropurpura vokesae and Pteropurpura macropterus are prevalent.

At the time that I began diving for California Murex, Pteropurpura vokesae and Pteropurpura macropterus were both very rare and seldom-seen species; I can well remember the day when I actually trembled with delight at the sight of a lovely set of these shells in the personal collection of a friend. I think that I probably set my mind to wondering about where these dainty little creatures reside on that very day, and I set out on a search which took me almost two years to complete.



My search ended with that age-old conchological saying "Shells are where you find them!!". The originator of that little statement forgot to add the fact that first one must discover the natural habitat of any given species, and in my case it took two years!

Pteropurpura macropterus is not a very selective creature regarding the type of bottom that he likes to live on, and I have found him thriving in the following environments: hard rock bottom with lush growths of algae and kelp and intermittent outcroppings of boulders and rock ledges; smooth, hard rock bottom with absolutely no bottom growth or rock outcroppings. The specimens taken on this type of bottom are always very heavily coated with lime and are not desirable as specimen shells; silt bottom with large rock reefs or ledges and boulder rubble piled up in front of the ledges. This type of bottom seems to house the really choice specimens, and they will be found clinging to the tops and sides of the boulders. Choice specimens may also be found partially buried in the silt edge where the sloping, backsides of each ledge meet the bottom. Heavily coated specimens may be found on the tops and vertical faces of the ledges, and I generally never even bother picking these up. It is very unusual to find Pteropurpura macropterus residing on the silt channels between the rock reefs or ledges. Incidentally, I forgot to mention that these rock ledges are almost always located on a parallel plane with the shoreline, and the distance between each ledge varies between 10 feet and 100 feet, usually dependent upon the depth of the water. They are located closer together in the deeper water, meaning 80 feet and up; this species may also be collected on a silt bottom with a covering of small stones, and the shells will be found delicately perched on a piece of rubble approximately 1/10th his size. There are usually very choice, almost-uncoated specimens; and last, this species may be found on large rock reefs which are surrounded by large expanses of course, white sand. The specimens taken here are generally very heavily coated with various types of marine growth, especially a very destructive purple-colored growth that has a bad habit of almost completely eating away the varices of Murex. Needless to say, these latter specimens are not in any way collector's items, and I simply leave them alone.

Pteropurpura vokesae is a much more selective mollusk than his first cousin macropterus, and he chooses only several types of bottoms to live on, as follows: I have found this species to particularly favor the silt channels or expanses between rock reefs or ledges, and they prefer to live in waters over 70 feet (I found them to be quite evident in 140 ft.). They are occasionally collected in pairs or threesomes, but they seem to be prevalent as singles or "loners". They will occasionally be found nestled comfortable underneath a breeding colony of Pteropurpura macropterus on the boulder rubble that piles up in front of the rock ledges, sometimes with unidentified eggs in tow (the question might arise as to which species the eggs belong to, and I am baffled over this one): this species may also be collected on silt bottoms with small, stone rubble, in company and seemingly in perfect harmony with its favorite cousin macropterus; this shell does not like large rock reefs or ledges, and the occasional specimens that are taken here are very heavily coated and are not specimen shells.

Pteropurpura vokesae does not attract excess marine growth like Pteropurpura macropterus, and the encrustations do not seem to anchor themselves as readily on the vokesae as they do on the macropterus. If

there are heavy encrustations present on a specimen of vokesae, they are almost always very easy to remove and hardly ever leave any damage to the exterior surface of the shell. I have observed that the vokesae coats himself with a protective covering of silt and some sort of secretion from the mantle of the mollusk; this coating generally repels any serious growths of lime or other destructive marine encrustations, and it acts as a camouflage also. I have also seen, on rare occasions, macropterus that were coated with this protective covering, but not nearly so often as the vokesae.

Once the Murex are collected it is then time to go through the drudgery of removing the living mollusk and cleaning the shell for the cabinet. There are numerous methods of doing this, but I will relate my own, personal method, which has worked in an almost foolproof fashion for myself and my associates. First, I always individually scrub the surface of each shell with a soft-bristled toothbrush to remove the loose dirt and "grunge" that attaches itself to almost every shell beneath the sea (I do this on my boat immediately after surfacing from a dive). Excess amounts of mud or dirt will very quickly neutralize the potency of any cleaning agent that is being used, and it is a small chore to remove this material prior to taking the shells home for the final cleaning steps. After doing the above maneuver I always cull the load and take out the imperfect and broken specimens, which I personally return to their respective environments on the bottom; I also return all juvenile shells to their homes. Next, I take the collected specimens home (my home that is) and place them in boiling water for approximately five minutes; this kills the mollusk and enables its removal from the external skeleton, or shell. Removal of the mollusk can be accomplished by grasping the cooked material firmly with a sharp implement and gently twisting the animal round and round in a clockwise manner until it comes out. In using the term "sharp implement" I could be talking about almost anything that could either grasp or be inserted into the cooked mollusk. After removing the mollusk I always save each operculum, as this is an important part of the shell. Once the animal and the operculum have been removed I then put the shells in straight pool chlorine bleach for varying lengths of time depending on the degree of coating. Murex may be left in chlorine bleach for almost any length of time without causing any noticeable damage to the shell, but I find that a maximum soaking period of 24 hours will just about take care of anything clinging to the surface of the shells. After removal from the bleach thoroughly wash each shell with fresh water and then allow the shells to dry. Once the shells have completely dried the bleached coatings, having been undermined and saturated with chlorine, may be gently plucked away from the surface of the shell with knives, dental tools, ice picks, or anything that suits the desires of the shell cleaner. Now we have reached a very crucial stage in our cleaning operation, in that we are herewith presented with that horrible question, "Do I use acid on this one???" So many times this question has crossed my mind, and I have worked it out to the best of my ability via the sometimes-painful process of trial and error. I find that a very light, brushed-on dab of commercial-grade Muriatic Acid on the body whorl and varices of the smooth type Pteropurpura macropterus will bring out a spot of color that was absent before the brushing. Again, I leave the above procedure strictly up to the individual who owns the shell, as some folks might say that this is an unnatural, semi-artificial way of "coloring" the shell. I sometimes find the surface of the smooth type Pteropurpura macropterus to be lightly covered with a misty, whitish-



colored film after the preliminary cleaning stages, and the acid treatment or acid brushing ( not an acid bath ) removes this. I try not to use any acid on the spire and apex area, as it will ream out the sutures on the spire and give that particular area a very unhealthy, overcleaned appearance. I never use any acid on any Murex that have imbricated surfaces to their shells; this completely rules out Pteropurpura vokesae and most of the variations of Pteropurpura macropterus as being probable victims of the "dreaded acid treatment". Actually, it is not all that bad, and some of my very finest, showpiece specimens of Pteropurpura macropterus were carefully treated with acid.

Now we come to the final stage of our cleaning operation, which involves the replacement of natural oils in the surface of the shell which were removed during the boiling and bleaching steps of the cleaning process. Some collectors use a strange solution of glycerin and alcohol, some use Johnson's Baby Oil, but I use light gauge Squibb's Mineral Oil. Thus far the only complaints that I have received regarding this particular phase of the cleaning operation were a few loud cries of "greasy fingers", which cannot be avoided unless one handles his or hers shells with gloves (that's no fun!!). And finally, in closing out discussion of the cleaning procedure I will urge everyone to always replace the proper operculum with its proper mate.

Now that I have excited every reader to the point of "frenzy", I will further advise each and every able person to travel to your nearest local dive shop, rent some underwater diving equipment, select your diving spot, and last but not least, follow my instructions as outlined in this article and collect your own Pteropurpura macropterus and Pteropurpura vokesae, thus eliminating the illustrious "middle-man", or, in this particular case, shell dealer. (In essence I have just slit my own throat!!!).

### MEXICAN FIESTA

Our Mexican Fiesta at the home of David and Margaret Mulliner in Pacific Beach was very much enjoyed by members and their guests. They came in costumes of-let us say-Mexican feeling but there were some authentic versions: a dark blue camisa, a hand-embroidered blusa with a long falda - both traditional folk styles, modern concepts were in drawn work with knotted fringes instead of hems - a blusa/and falda in soft lines and vibrant colors - sombreros, at not too accustomed angles - bright shirts, ponchos.

There was the "Flowing Bowl" of a delicious punch. The "Pot Luck" food, when not authentically Mexican, was of that heritage and inspiration, all savory, muy sabrosa.

The soft lights ranged on the top of the patio wall were very effective. Votive candles burned with a steady glow, set safely on sand inside paper bags.

By Jules Hertz

SEASHELLS OF TROPICAL WEST AMERICA, Second Edition, by Dr. A. Myra Keen with the assistance of Dr. James H. McLean, Stanford University Press, 1971.

To those of us who collect shells frequently south of the border, Dr. Keen's first edition published in 1958 has been a bible. After a long day of enjoyable collecting, it was second nature to get out "Keen" and pour over the descriptions and illustrations. Just as the first edition has been a standard for shells of the Panamic province for the past 13 years, the long awaited second edition is certain to carry on this tradition for the next 20 years.

The new edition has extended the coverage to northwestern Peru. Some 3,325 species are treated, many of which are microscopic and/or deepwater forms not treated in the earlier edition. Also included for the first time are descriptions of the shell-less mollusks. The book contains some 4,000 halftone and line illustrations, and 22 color plates. A new Introduction and a chapter on the Phylum Mollusca are welcome additions.

Major segments of the new edition are contributions of well known workers in the field of malacology, i.e.: Turridae and Archaeogastropoda (up to the Neritacea), Dr. McLean; Terebridae, Twila (Mrs. Ford) Bratcher and Mr. Robert Burch; Polyplacophora, Mr. Spencer Thorpe; and Marginellidae, Dr. Coan and Mr. Barry Roth.

In addition to treating almost twice the number of shells, the second edition has shown marked improvements over the first edition in several major areas. One area is in the improved reproductive quality of the halftone and line illustrations. This was one of the weak points of the earlier book, and often made for very frustrated collectors. New chapters on "Rejected and Indeterminate Species" and "Geographic Aids" are also valuable additions. Improved descriptions and freer use of multiple pictorial views are also improvements.

The quality of photography and extent of shell description does not compare with other recent major books on malacology such as THE LIVING COWRIES or THE LIVING VOLUTES. However such a comparison would be completely unfair since it would be an exorbitant and Herculean task to describe and picture more than 3,300 species in such detail.

The color plates used in the earlier edition are included in the new book but for some unknown reason (perhaps their familiarity) look completely out of place. The twelve new color plates contain beautiful photographs of both shells and mollusks, but their indiscriminate inclusion in one section seems primarily decorative rather than scientific which detracts from the book. The Calliostoma in Plate XIII appears mislabeled. This writer found several other disturbing features to the new edition; i.e. (1) the section on chitons, although completely rewritten, still leaves much to be desired--many of the halftones being undistinguishable, and (2) the inclusion of poor photographs or line illustrations on many deep water pelecypods without accompanying descriptions on shell features.

Dr. Keen and the many contributors to this book are to be commended for their achievement. It is a book well worth owning.



## ENCOUNTER

In our never ending quest for the elusive rare gem for our collections, I am sure we have all become acquainted with the shy retiring octopus, whose first instinct on seeing man is, wisely, to hide.

I have kept octopuses in aquaria and delight in watching their antics. However, although I frequently see them in the ocean, I rarely get a chance to observe them as they immediately slither into some nook or cranny and view me with an unfriendly, cold and suspicious eye. How strange therefore was the following incident that occurred last week.

I was shore collecting at Tourmaline Canyon in La Jolla and standing in water just above my ankle transferring my watch from one wrist to the other, when I felt something brush against my ankle and wrap around it. Thinking it was a piece of kelp or seaweed, I merely wriggled my foot free absentmindedly, as I was concentrating on not dropping my watch in the water. I felt the sensation again and shook my foot a second time somewhat the way you would do if a fly landed on your leg, still not bothering to look down.

My watch at last transferred, I prepared to move on when I again felt my ankle tenderly gripped and this time I finally did look down to disentangle myself. You guessed it! An octopus was lovingly carressing my sneaker with three of his arms. When he saw he had my attention, he gave me a rather disgusted look and reluctantly let go and began moving away. He was a fair size and I do not know what designs he had on my sneaker, but obviously he could not have mistaken it for a lady octopus or vice versa. At any rate, watch your sneaker, it may have a life of its own.

Barbara W. Myers

## A FRIEND

I tried to make a friend of a creature in the sea,  
But every time I see him, he acts afraid of me.  
I always greet him fondly; I don't disturb his den,  
But he just glares at me and says "Don't come back again".

I've seen people try to grab him and hit him with a stick,  
They say they want to eat him; I hope he makes them sick.  
Small wonder when he sees me he swims away so fast,  
And he even inks the water with a furious blast.

When I tried to tell him, "I'm one of the good guys, don't  
you see?"

"Very interesting," he replied, "You all look the  
same to me!"

Barbara Myers (Oct. '69)

(Friends at last!)

## A WEEKEND AT SAN ISIDRO, BAJA CALIFORNIA

Carole M. Hertz

Last month the Mulliner and Hertz families took off in the Mulliner's Rolling Rancho and spent a weekend in Baja California on the Pacific at a beautiful spot just north of San Isidro and south of Punta Cabro. The rugged coastline there forms a series of small coves, partly protected from the heavy surf, with clean sandy beaches. The area was almost devoid of tourists, perhaps due to eighteen miles of roller coaster from the main highway to the coast.

Our weather was perfect--warm and sunny. The water was beautiful and clear and surprisingly warm. Unfortunately there was very little for the shell collector. We barely eked out an abalone dinner--Dave did find three great-grandpa Haliotis cracherodi which were delicious.

Also seen through the snorkler's mask were some sharks. Dave's assurances that they were "the harmless kind" did little to assuage the fears of this coward. I was so busy shark watching and listening to my heart pound that I might have missed great treasure--had there been any!

We also did some shore collecting though we didn't have any true low tides. But it was enjoyable just being out in the clear air and sloshing about in the tidepool areas. Following is a list of all the shells observed though most were not collected.

<u>Megatebennus bimaculatus</u> - dead	<u>Plinices recluzianus</u>
<u>Figurella Volcano</u>	<u>Ceratostoma nuttalli</u> - dead
<u>Colisella digitalis</u>	<u>Ocenebra gracillima</u> - dead
<u>Colisella scabra</u>	<u>Acanthina spirata</u>
<u>Colisella conus</u>	<u>Acanthina punctulata</u>
<u>Colisella strigatella</u>	<u>Acanthina paucilirata</u>
<u>Colisella asmi</u>	<u>Thais emerginata</u>
<u>?Notoacmaea fenestrata</u>	<u>Macron lividus</u>
<u>Lottia gigantea</u>	<u>Amphissa versicolor</u> - dead
<u>Calliostoma supraganosum</u> - dead	<u>?Nassarius perpinguis</u> - dead
<u>?Lirularia succinta</u>	<u>Mitra idae</u>
<u>Norrisis norrisi</u>	<u>Olivella baetica</u> - dead
<u>Tegula aureotincta</u>	<u>Olivella biplicata</u>
<u>Tegula funebris</u>	<u>Conus californicus</u>
<u>Tegula gallina</u>	<u>Cyanoplax hartwegii</u>
<u>Littorina planaxis</u>	<u>Nuttallina fluxa</u>
<u>Littorina scutulata</u>	<u>Mopalia muscosa</u>
<u>Epitonium tinctum</u> - dead	<u>Stenoplax consipcua</u>
<u>Opalia funiculata</u> - dead	<u>Mytilus californianus</u>
	<u>Mytilus edulis</u>
<u>Donax gouldii</u> - dead	<u>Hinnites multirugosus</u> - dead
<u>Penitella conradi</u>	<u>Leptopecten latiauratus</u> - dead
<u>Mytilimeria nuttalli</u> - dead	<u>Pododesmus cepio</u> - dead
	<u>Pseudochama exogyra</u> - dead
	<u>Diplodonta orbellus</u> - dead
	<u>Tivela stultorum</u> - dead
	<u>Protothaca staminea</u>



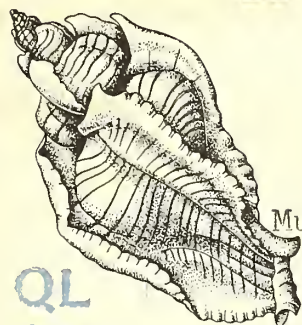


THE

# FESTIVUS

## SAN DIEGO SHELL CLUB

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### AQUARIUM OBSERVATIONS

From time to time we hope to be able to print observations by our members and friends who have aquaria or who dive and take the time to "see" as well as "sieve". Please send us details of any interesting occurrences you may have noted. They need not be long. We'll group them and have a newsworthy column.

In our small aquarium, the Cypraea spadicea relentlessly pursued an anemone round the tank nibbling at its adhering and whenever possible. I'd never seen an anemone 'swim' before. After a number of days the cowry killed and completely ate the anemone. This same Cypraea has been seen eating Laevicardium substriatum and also dead matter in the tank.

Carole M. Hertz

I have kept some several octopuses in aquaria over the past couple of years and for the most part they stay out of sight, hidden in a shell or behind the filter, etc, and only come out at night. However, if you are really interested and observant, you begin to put together a personality and an intelligence.

The octopus I now have lives with an Opaleye some five inches long. The octopus, stretched out, is just about six inches from arm tip to arm tip. The fish thinks he is the absolute ruler of the aquarium and makes all the motions of any bully -- swimming powerfully back and forth, nipping at the cowries so that they withdraw their mantles and at the other shells so they close their opercs.

I do not say the octopus is not frightened of the fish. He simply outwits him. When he is tired of the threatening tactics of the Opaleye, he just piles a bunch of shells at the opening of his house and relaxes. If he really wants something (say I have just put in a crab) the fish doesn't stop him from getting it. He slithers out of his home changing colors like mad, flicking an arm at the fish and -- if all that isn't enough for the poor fish -- the octopus inks and is gone. I put a crab in one day and the octopus had so many shells piled in the opening of his house that he couldn't get in with the crab. As I watched, he held the crab in four arms and with the other four was throwing shells hither and yon and changing colors with amazing speed. Then there is the story of the cowry -- the up and down norrissia -- but I'll save these for another time.

Barbara Myers



## AQUARIUM OBSERVATIONS

By Suzanne Hertz (aged 9½)

We have two Cantharus macrospira in our tanks. We found them at San Felipe and put one in each tank. They both had eggs on them, since it was mating season. The Cantharus macrospira's eggs are always on the backs of their shells.

It has been about two months since we took them and now it looks like there are baby Cantharus. The babies walk around the walls of the tank. They don't move very fast. They're about three millimeters long. I have counted two so far.

## AQUARIUM OBSERVATION

By Carole M. Hertz

Our tank contains a ferocious hermit crab which patrols the area in its Calliostoma gloriosum shell. Friend crab climbs on all other inhabitants in the tank, pokes at them and in them and is ever on the prowl.

Yesterday Crab got its comeuppance. It had stuck its leg in one too many bodies. A tiny Donax Gouldi reacted to the invasion and clamped tight imprisoning Crab's leg between its two valves.

Crab appeared furious. It clanked along with its new shell foot apparently trying to shake it off, grab it off with its claws or knock it off by banging it on the shell of Bursa californica, which seemed oblivious to the happening.

Crab suffered this indignity for more than ten minutes before escaping from the grip of the Donax. This is surely subjective but it seemed to me that on its release, Crab retreated to a corner of the tank to minister to its wounded leg.

## AQUARIUM OBSERVATIONS

By Barbara Myers

"What is so rare as a day in June" when you look in your aquarium and find that the crumby looking Bursa californica you have had for 1 1/2 years has grown a new body whorl (in a Bursa this means that more than half the shell is new) and it is not only twice as big, but is now the main attraction in your "sea world".

Actually it was February when I first noticed this phenomenon taking place and at that time the whorl was about one-third completed. The Bursa was collected in Sept. 1969 at Punta Banda, B.C. It lived quite peacefully with the rest of the inhabitants of the aquarium until the day I put in a purple sea urchin. Within minutes the Bursa appeared with its long elephant-like snout searching back and forth. It located the urchin and devoured same, notwithstanding the spines which it appeared to enjoy as much as the rest of the animal.

With its new body whorl completed this month (June), it now measures 65 mm compared to 43 mm when collected. Compared with the dingy white of the upper whorls the new growth is a lovely light tan with five narrow dark brown stripes. The aperture is now a delicate pink.

## AQUARIUM OBSERVATIONS

### POLYPUS BIMACULATUS - "PUSS"

By Barbara Good

"Puss" is a small - very opinionated - Polypus bimaculatus (octopus), with a personality which required more individual recognition, so now identified for this writing as "Puss".

Puss's principle residence is the Pacific Ocean, but he (she?) temporarily resides in my salt water aquarium. In it is a large Murex princeps, which serves as a temporary abode. Puss is quite content, so far as one can tell, except when the urge to hunt or eat besets him. Either - or maybe both - causes him to leave the Murex Princeps and stalk the entire aquarium for prey.

Hermit crabs are his easiest targets. He literally 'gobbles' them, no matter how many are placed in the tank. When the hermits are exhausted he attacks anything alive that doesn't move too fast. Limpets are easy prey for him. A small clam that he has attacked several times continues to defy him. The clam apparently is not subject to avoid 'Puss' but recently has hidden in the sand to avoid the constant involvement. (My research on the remains as I clean the aquarium indicates that Polypus bimaculatus do actually drill a shell to withdraw the food therefrom.)

As already indicated, Puss has his way! Recently my son provided fresh abalone for the household. Naturally, I wanted to share with 'Puss'. When I pushed it into the hole left by the loss of the operculum in the Murex princeps he not only refused the delicacy but purposely removed it from his immediate surroundings. He moved it as far away from his abode as space would allow.

Later, I was watching him as he roamed the tank looking for some action. As all the hermit crabs were eliminated and the limpets were in scarce supply, I offered him my finger. It was something new, and apparently he did not like it. I followed him probing and pushing. Indignant at this treatment, he proceeded to crawl out of the tank, over the floor looking for his true home - the Pacific Ocean. Again my son came to the rescue--recovered him and returned 'Puss' to the aquarium. We then installed a cover, which allegedly will retain 'Puss' in his present quarters.

My observation of 'Puss' indicates there are many mollusks that Polypus bimaculatus will not attack. There are several Cypraea spadicea as well as Mitra idae which 'Puss' carefully avoids. He did attack a small Ceratastoma nuttalli which I rescued. In checking back, I determined he had not had any hermit crabs or limpets for over a week. Obviously, it was hunger - not just the hunting instinct at work.

As much time and difficulties that I am having with 'Puss', my family and I now recognize him as he would desire - as an individual of a species.



## AQUARIUM OBSERVATIONS

By Barbara Good

Generally speaking mollusks in the genus *Cypraea* are believed to be herbivorous and to feed on algae. However, from my own observations I have learned that *Cypraea spadicea* can be a definite predator and also a scavenger.

Early in 1971 I placed two *Cypraea spadicea* in my aquarium. At first they appeared to feed on the algae on the sides of the tank. However, one of them soon apparently became bored with this bland diet and went in search of more delectable fare. *Norrisia norrisi* was his first victim. (As observed in the aquarium, this poor snail seems to be preferred by many predators.) After satisfying his hunger on the *Norrisia*, the *Cypraea* became inactive for a while. In the meantime the other *Cypraea* was not observed to be eating anything. In fact, he was inactive and apparently not in the best of health.

One day at Mission Bay during a very low tide I found a good number of *Leptopecten monotimeris* washed ashore alive in seaweed. I took several of this attractive species home and placed them in the aquarium, where they soon attached themselves to the sides of the tank. The sight of these little *Pectens* awoke *Cypraea* number one from his lethargy (caused by a full stomach no doubt), and he immediately attacked the defenseless *Pectens*. In no time at all he had eaten almost every one - fortunately, not damaging the shells, so I was able to save them for my collection.

Shortly after this the second *Cypraea* died one night (or possibly was merely near death). In the morning I found the other one feasting on him! After this I was very careful not to put anything in the aquarium that I was not willing to have serve as *Cypraea* food.

It may be of interest to note that when collected this *Cypraea* had the normal glossy shell of his species. However, when he died, almost a year later, the shell was dull and lusterless. This may have been caused by the fact that his mantle was retracted almost all of the time. Or possibly it was due to the water in the aquarium. Does anyone have any ideas on this question?

## AQUARIUM OBSERVATIONS

By Carole M. Hertz

We thought that perhaps the reason our *Cypraea spadicea* had attacked and eaten the anemone in our tank was that the anemone had been sick or weak.

Now we'd found another healthy anemone attached to a small rock. We brought it home--still on its rock and placed both in our tank. Within several hours this new anemone was "swimming" around the tank with the cowry in hot pursuit. The cowry killed it in several days and by the end of a week there was no trace of the anemone. The stalking *spadicea* had struck again.



# AQUARIUM OBSERVATIONS

By Carole M. Hertz

On April 18 of this year I collected two Cypraea spadicea which we put in one of our two one gallon aquaria. Both shells were approximately the same size, found on the same day in different areas of the jetty in San Diego. Both shells had slight defects which I hadn't noticed on collecting them, but for which I was later thankful since it made it easy to tell them apart. Almost immediately after placing them in the tank, the one cowry went to an end of the tank and remained in one small area. I noticed that the foot of this animal was much larger than the other's and spread out in a more or less heart-shaped pattern, different from any other C. spadicea we'd observed before.

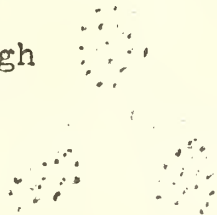
Cowry on glass

By April 28, we observed particles between the foot of the cowry and the glass. The amount of particles seemed to change and the position of the particles under the foot differed from time to time. Sometimes none were visible and other times we could see up to six. Our assumption was that these were egg capsules. We had read that the cowry will sit on her eggs to protect them after they are laid in rock crevices.

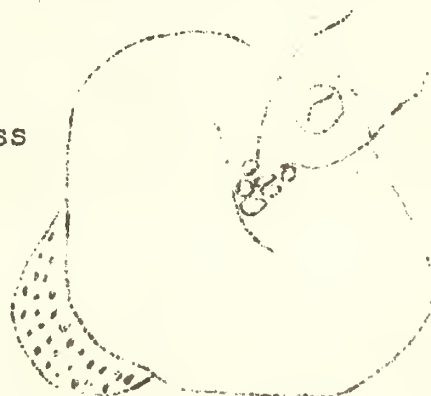


(Abbott in SEASHELLS OF NORTH AMERICA and Burgess in THE LIVING COWRIES.). If this is so, we were getting a most unusual view of these eggs while they were developing.

Eggs as they appeared through our magnifying glass.



Cowry on glass with eggs in "clutch"



On the morning of the sixteenth of May, we counted at least eight "clumps" of eggs near the anterior end of the foot, in a "clutch" shaped area. The cowry was still on the same small section of glass. We called Dave Mulliner and asked (demanded) him to please come up and see if he could get some pictures of this. (Doctors may not make Sunday house calls but our photographer did, and he was here within an hour). The position of the eggs had changed again by that time and only a few were visible. Dave got some excellent shots which he will show at a future Club meeting.

By the 23rd of May the animal's foot seemed smaller, though still larger than that of the other cowry, and no eggs had been noted for four days. (During this whole period we have been watching for veligers but have seen none. It is more than likely that conditions in our very small tank are not suitable). On the 24th, the animal left the small area of glass and now has settled for the second day on the adjacent panel. The foot appears "normal" in size and shape and no eggs are in evidence.

Though we have not seen any veligers throughout, we feel that we have been treated to a rare glimpse of Nature.

A Cassis centraquadrata was collected south of San Felipe at Radar Beach, Baja Calif Mexico. We brought the Cassis back to San Diego and placed it in our aquarium. The feeding habits of the Cassis are interesting. It eats sea urchins.

The Cassis normally lives under the sand but when he is hungry he will surface and start tracking any sea urchin in the tank. If an urchin is captured out in the open, the cassis will sit on his spire, cuddle the urchin in his foot and eat all of the insides. Then the cassis will eat all the spines.

The other day the Cassis captured an urchin in the corner of the tank. The Cassis drilled a hole in the side of the urchin shell and ate only part of the animal. Possibly it wasn't very hungry. Nevertheless, it still ate part of the spines.

Dave Mulliner

### AQUARIUM OBSERVATION

By Nola Michel

I found something quite interesting in my aquarium the other day. First the circumstances. The aquarium is about 40 gal. and contains some long-time residents -- all had been there for months -- no new specimens had been added. I had just cleaned said tank, rinsing all the long-resident sand with fresh water. I then returned the sand and residents to the tank with clean salt water obtained from the salt water spigot at Scripps Institute of Oceanography. Less than two weeks later I observed live Caecum on the plexiglas sides of the tank. I 'collected' three specimens and observed them closely, leaving at least three more specimens in the tank. I have not seen them lately -- perhaps they are in the sand. Ooops, just looked in the tank, one is hanging on the surface tension of the water, near the side of the tank. Where did they come from? My guess would be the water.

There are good illustrations of Caecum in the Golden Field Guide, Seashells of North America, pg. 87. I found the animal in this specimen to be very white with the operculum almost black. The animal when extended from the shell was very active, flipping the whole shell as though it were a tail.

### AQUARIUM OBSERVATIONS

By Carole M. Hertz

At the Bay during low tide, we collected some specimens for our aquarium, among them a Solen rosaceus Carpenter. We later regretted it when we observed the poor animal attempting to "dig in". It tried repeatedly without success. Suddenly it propelled itself across the tank like a missile, ricocheted off the opposite side and "swam" back to the first side where it continued to try to bury itself.

The following morning we noted it being eaten by the Bursa Californica.



## AQUARIUM OBSERVATIONS

by Nola Michel

*Simnia aequalis* (Sowerby 1832)

Form: *S. Quaylei* Lowe 1935

While snorkeling at a good low tide some miles south of San Felipe I found two *Simnia* on red *Gorgonia*. They were about four feet deep. One animal and shell was a beautiful red and the other, animal and shell was white. I placed them in a plastic container of salt water and they survived the rather cool night. As they were still alive the next morning I decided to try to take them home to my salt water aquarium.

Late that afternoon (Feb. 18, 1969) they were placed in the aquarium. It's about 45 gal. and at ambient temperature. Salinity was 1.030, slightly saltier than normal sea water as I had not added distilled water to the tank in some time. 'Resident' occupants were other assorted mollusks and a fish. The *Simnias* appeared to be doing nicely, although they had no *Gorgonia* on which to feed.

About seven to ten days later I noticed eggs on a branch of the dead black coral. The black coral was a decorative item in the tank, but closest to their natural habitat. The egg group was about an inch long and encircled the branch. The eggs individually looked like grayish gelatin dots. I was rather excited but I didn't make any special preparation as I thought that the fish would eat the eggs. Shortly after the 1st of April I noticed a color change in some of the eggs. Some were getting an orange-pink and were looking slightly larger than the others. Approximately 25% of the eggs were this way.

April 9th. The fish has gone. I drained the aquaria to a level above the eggs. Slowly I brought the salinity to 1.025 over a period of 24 hours. Then I refilled the tank with fresh sea water from the public outlet at Scripps. Everything then seemed good.

Then I talked our friend Emil Habecker into coming over to take some slides of the animals and the eggs. He came on the 13th and pictures 1 & 2 were taken at that time. The next day I went diving and obtained some *Gorgonia* for the *Simnia* to feed on. I placed it in the tank and within half an hour both were on it and feeding.

When I checked the tank the next morning an egg on the end of the group was split open and was entirely empty. Others were emptying. You could see the tiny veligers with a hand lens. I moved a piece of the *Gorgonia* to a position beneath the egg mass, hoping that some might settle on it. I also removed the charcoal filter at this time, so they wouldn't be filtered out of the water. I did leave the subsand filters on though. Felt they were necessary but did slow them down considerably.

On the 18th I placed brine shrimp in the tank hoping the *Gorgonia* would feed on them. They didn't but left them in to breed, thinking that they might feed on the smaller off spring.



On the 24th my boy reported that one Simnia was on top of the other. Sure enough the white one was on the red. And on the 25th new eggs were laid. They were on the Gorgonia. Each one on a polyp, all around the stalk, two down on one side of the stalk and up to eight on the opposite side. The next day there were more on a different tip of the same Gorgonia. I talked to Emil again and the next evening he came to take more pictures. Pictures 3 - 6 were taken at this time.

On the 30th I had to dispose of 2 pieces of Gorgonia as they were going foul. Not the one with the eggs on it, however. That evening I discovered the Simnia copulating on an egg mass. They had added more eggs to this mass. The White (male) was on top of the Red (female). His penis extended down the right side into the female. She seemed to be twisted up to meet him, her antennae were rolled back toward him. There was hardly any movement, only her antennae. She had a swelling, anterior to the point of entry. They both had their mantles fully extended.

These animals lived in my aquarium for about a year. The veligers never settled out and grew. Perhaps the down current of the subsand filter was too strong or some vital trace elements may have been missing from the water.

Now, some about the pictures. All but no. 7 were taken by Emil Habecker of the San Diego Underwater Photographic Society. No. 7 was taken by our own Dave Mulliner, after the demise of the animals. Picture No. 1 was shot on a rock. The animals were placed there for photographic purposes. No. 2 is a close up of the eggs laid on the black coral. No. 3 is the same egg mass, the entire thing, showing the opened capsule on the end. No. 4 shows the eggs laid on the Gorgonia - they are the smoother round clear-white objects on the polyps. No. 5 is "Him" on Gorgonia. Note the difference in coloration compared to No. 1. The color spots in No. 5 are the same in number but larger in size. This picture was taken after two weeks of feeding on the red Gorgonia. When I first observed them I could see the radula working in the white animal - he was that translucent. After feeding on the Gorgonia he lost this translucency. No. 6 is "Her" on eggs at the tip of Gorgonia. One of the eggs is visible in the lower left area of the picture. No. 7 was taken by Dave Mulliner to show you what the shell looks like. These are the same specimens.

Application for membership ---- SAN DIEGO SHELL CLUB

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_  
\_\_\_\_\_

TELEPHONE \_\_\_\_\_

Main collecting interest \_\_\_\_\_

Regular Membership \_\_\_\_\_ \$3.00

Family Membership \_\_\_\_\_ \$4.00

Corresponding Membership \_\_\_\_\_ \$2.50

Overseas Corresponding Membership (surface mail) \_\_\_\_\_ \$3.50

Please remit to Treasurer      Mrs. Kay Taylor  
   2437 Aster St.  
   San Diego, Calif. 92109

Make check Payable to: SAN DIEGO SHELL CLUB

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\_\_\_\_\_

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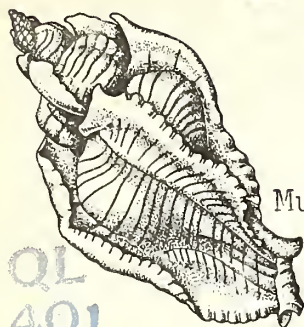
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## SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968

Museum of Natural History - Third Thursday - 7:30 P.M.

President: Clifton Martin  
Vice President: John Michel  
Recording Secretary: Clifford Martin  
Corresponding Secretary: Jeanne Pisor  
Treasurer: Kay Taylor  
Editor: Blanche Brewer

ANNUAL DUES: Single membership, \$3.00 - Family, \$4.00 - Corresponding membership, \$2.50 - Overseas mailing, \$3.50. Payable to San Diego Shell Club, 2437 Aster St., San Diego, Calif. 92109.

Vol. III

January 1972

No. 1

\*\*\*\*\*  
\* PROGRAM, January 20. \*  
\* Identification of Nudibranchs (nudi-cuties, N.M.) David Mulliner \*  
\* MEMBERSHIP DUES ARE NOW PAYABLE FOR 1972. \*  
\*\*\*\*\*

### MARICULTURE OF ABALONE

By Dr. David Leighton

Dr. David Leighton was our guest speaker the evening of November 18, his subject, the mariculture of abalone. He told us of his experiences while working with the California Marine Associates for the past few years - of finding a feasible and profitable method of growing - or farming - abalones. There is another group in the San Francisco area doing similar work.

Dr. Leighton, who is a charter member of our Club, explained that an adult female abalone may release as many as fifty million eggs in her lifetime, but for various reasons only about five per cent will ever live beyond the veliger stage. Thus, a protected environment, nurturing only abalones, can insure an increase - perhaps a very high one - in the percentage of survival of this eagerly sought sea animal.

The California Marine Associates' experimental plant is located about five miles north of Morro Bay at Pt. Estero. Movies were shown of the Estero operation and Dr. Leighton told of the many problems and difficulties involved in getting started with the work that has been carried out there.



Huge growing tanks have been constructed. They are a hundred feet square and twelve feet deep (the one shown, that is). Extending from two opposite framing walls are several dividing walls in an alternating arrangement - the "rocks" for the clinging abalone. There is an open area in the center where the inflow of sea water, moving with the impetus of the pumps, swirls around the jutting walls, simulating the movement of waves.

The sea water had to be pumped up about one hundred feet to the tanks. Several pumps were used before a satisfactory one was found. Before entering the tanks the water runs through large sand filters. This keeps out unwanted sea weed and other marine life.

There are other large tanks in the hatchery building to hold the abalones for spawning. The hatching of the larvae was shown, also young abalones about six weeks old. As veligers they are quick-moving free swimmers. Also shown, in their final metamorphosis, were specimens from thumb-nail size to perhaps five inches in width - not quite steak size. Here it should be noted that the Estero project is primarily a "seed" operation.

Kelp must be harvested to feed the abalones while they are being held and this is abundantly available in the vast beds that sway in the water directly below the station.

Many hybrids in beautiful color variations were shown. Dr. Leighton stated that several hybrid specimens have been found off the Palos Verdes coast of California.

#### FROM THE MINUTES BY CLIFFORD A. MARTIN

Following the talk by Dr. Leighton, David Mulliner showed slides of the Mexican Fiesta Party our Club had at his home in September. Our

Our President, Roland Taylor, and his wife Kay brought two trays of the shells they collected while in Ireland and Spain this summer.

During the business section of the meeting Anthony D'Attilio presented Volumes 2, 3 and 4 of Notes of the New York Shell Club. Volume 1 had been loaned to the editor and was included in the gift.

The slate of officers nominated by the Board was accepted unanimously. Officers elected were: President, Clifton Martin, Vice President, John Michel, Recording Secretary, Clifford Martin, Corresponding Secretary, Jeanne Pisor, Treasurer, Kay Taylor.

#### TWO NEWS ITEMS

Anthony D'Attilio had a one-man art exhibit at the San Diego Art Association's Gallery in Balboa Park through the month of December.

Art and Emma West and their shell business were featured in a full page story in the Chula Vista paper and on December 26 were presented on Personality Parade on Channel 8. By special request the story was repeated twice on December 28.





## CHRISTMAS PARTY

The San Diego Shell Club's Christmas party was held at the Miramar Naval Air Station Chief Petty Officer's Club on Thursday evening, December 16, 1971. The club staff had festively decorated the U-shaped tables with bouquets and garlands of silver and red poinsettias and greenery, to which Kay and Roland Taylor added the appropriate molluscan touch of sequined sea shells.

The evening started as a social hour, with costumed cocktail waitresses taking orders for Christmas cheer. A delicious roast beef dinner was served and after dessert and coffee Dave Mulliner M.C'd. officer installation ceremonies:

Clifton Martin replaced Roland Taylor as President;  
John Michel took over Clifton Martin's 1971 position as Vice President;

Clifford Martin stayed on for another year as Recording Secretary;  
Kay Taylor replaced Margaret Mulliner as Treasurer;  
Jean Pisor replaced Virginia Hanselman as Corresponding Secretary.

Each party guest brought a packaged sea shell gift to be placed under the tree; and after installation everyone had a chance to select a gift from the assortment. Oohs and aahs from all quarters attested to the fact that many choice and beautiful shells exchanged hands.

The party later moved out into the club ballroom for dancing to their orchestra. It was a grand evening for all and marked a fitting climax to a very successful club year.

## THUMBNAIL SKETCHES OF OUR NEW OFFICERS

By David Mulliner

John Michel is our new Vice-President. John's interest in shells began while diving in Guam with the research vessel, Trieste. John and Nola have collected in Hawaii, Kwajalein, the Gulf of California and locally. When he is in foreign ports he buys shells he cannot collect himself.

Jeanne Pisor is Corresponding Secretary. Her interest in shells started with her marriage to Don in Florida. Don had started his collection in Tahiti in 1962. Jeanne and Don visited a shell shop in Florida for advice and books. Their pretty collection then became more serious and scientific. They joined the Astronaut Trail Shell Club and started trading for world-wide shells. In his work for the airline they have collected in the South Pacific and the Caribeen. They were members of the Santa Barbara Shell Club before moving to San Diego and joining the San Diego Shell Club. Jeanne and Don's main shell interest is in Cyprea, Murex, Cones and Volutes.

Kay Taylor is Treasurer. Kay and her husband, Roland, started collecting sea shells about six years ago. They began, as most collectors do, by picking up beach shells because they were pretty or had interesting shapes. While in Manzanillo, Mexico, the Taylors met Laura and Carl Shy who interested them in scientific collecting. They have collected along the Baja Peninsula, the west coast of Mexico (where they lived several years) and in Florida. They are building a world-wide collection - and world-wide friends - by trading shells taken on collecting trips.





The President, Clifton Martin and his twin brother, Clifford Martin, who is Recording Secretary were presented in Thumbnail sketches in the January issue of the Festivus for 1971.

## CAYUCOS REVISITED...FOR THE SECOND TIME

By Carole and Jules Hertz

Undaunted by the Christmas rains, we set out for Morro Bay and environs for a few days of relaxation, renewing acquaintances and collecting. It rained bountifully until our second day when it cleared just in time for low tide. After that it was glorious sunshine.

We did some collecting in Morro Bay near the boat docks and some observing in Morro Bay State Park but most of our collecting was at Cayucos. The area is a protected rocky outcropping, hosting a large variety of mollusks. We were fortunate in having fine low tides (from -1.1 to -1.8) during the afternoon hours. The rocks in the low tide zone were almost completely obscured by eel grass and kelp. Every rock and every tidepool was a surprise until we were upon it or in it.

We spent hours "combing" the eel grass and found some lovely new additions to our collection. We kept a record of all the shells we observed and they are listed below. Those marked with an \* are currently in our collection as a result of this trip.

<i>Haliotis cracherodi</i>	<i>Ceratostoma nuttalli</i>
<i>Haliotis rufescens</i>	* <i>Ocenebra circumtexta</i>
<i>Diodora aspera</i>	* <i>Ocenebra lurida</i>
* <i>Diodora arnoldi</i>	<i>Ocenebra subangulata</i>
* <i>Megatebennus bimaculatus</i>	* <i>Ocenebra punctulata</i>
<i>Fissurella volcano</i>	<i>Thais emarginata</i>
<i>Acmaea mitra</i>	<i>Amphissa versicolor</i>
<i>Colisella scabra</i>	<i>Mitrella carinata</i>
<i>Colisella limatula</i>	<i>Nassarius mendicus</i> (dead)
<i>Colisella ochracea</i>	<i>Nassarius perpinquis</i> (dead)
<i>Colisella asmi</i>	<i>Olivella biplicata</i> (dead)
<i>Notoacmaea insessa</i>	<i>Conus californicus</i>
* <i>Notoacmaea paleacea</i>	* <i>Clathralla canfieldi</i> (dead)
<i>Lottia gigantea</i>	<i>Pseudomelatoma torosa</i>
* <i>Calliostoma canaliculatum</i> (juv.)	* <i>Odostomia</i> sp. (dead)
* <i>Calliostoma gemmulatum</i>	<i>Mopalia muscosa</i>
* <i>Calliostoma ligatum</i>	<i>Mopalia lignosa</i>
<i>Tegula funebris</i>	<i>Mopalia ciliata</i>
<i>Tegula brunnea</i>	<i>Lepidozona cooperi</i>
* <i>Tegula pulligo</i> (juv)	<i>Stenoplax heathiana</i>
<i>Homalopoma luridum</i>	<i>Tonicella lineata</i>
<i>Tricolia pulloides</i>	<i>Septifer bifurcatus</i> (dead)
* <i>Lacuna</i> sp.	<i>Hinnites multirugosus</i> (dead)
* <i>Rissoild</i> sp.	* <i>Pseudochama exogyra</i>
<i>Bittium eschrichti</i>	<i>Glans subquadrata</i> (dead)
<i>Epitonium indianorum?</i> (dead)	<i>Protothaca staminea</i> (dead)



Hipponix antiquatus  
 Crepidula adunca  
 Crepidula perforans  
 Crepidula nummularia  
 Erato vitellina (dead)  
 Diaulula sandiegensis  
 Dendrodoris fulva  
 Hermisenda crassicornis

Hiatella arctica (dead)  
 \*Tellina bodegensis (dead)  
 Zirfea pilsbryi (dead)  
 Penitella penita  
 \*Mytilimeria nuttalli (dead)  
 Aniscodoris nobilis  
 Triopha carpenteri  
 (and one small red one Dave Mulliner  
 is still looking up)

## ODDITIES

By Jules Hertz

Occasionally one discovers a shell freak or aberrant caused by early damage to the shell or animal. On our recent trip to Morro Bay, we found a specimen of *Acanthina punctulata* (Sowerby, 1825) which had two teeth instead of the usual one. The shell appeared normal in all other respects except for a very localized defect in the immediate area of the teeth. The cause of such a defect is unknown but could have been a result of falling rocks, rough waters or a nibbling fish.

The Festivus invites other collectors to describe their freak shells.

## A BOOK REVIEW

The New York Shell Club was organized in December 1949 by a mere handful of persons interested in shells. Anthony D'Attilio was one of them.

They had their meetings on Sunday afternoons in a meeting room at the Museum of Natural History - quite informal. They had speakers, planned for field trips. It would be decided during the meeting what would go into the "notes" mailed to the members later. After the meeting it became the custom to go in a group to a nearby restaurant, a custom finally so well established that they would find tables arranged for them in a "U".

Anthony D'Attilio and Morris K. Jacobson felt the notes could be a learning medium and so began the articles about particular shells by Mr. D'Attilio illustrated with meticulous drawings - the records of field trips by various members in and around New York, but particularly by MKJ.

Land snails were the main shells collected and they searched for them in parks, little wooded areas, moist rocky places - and near greenhouses, whose proprietors welcomed the snail gatherers. There is an account by one member of a trip to San Diego and on down into Baja California in search of a particular land snail - not one word of the wealth of fauna in the Gulf.

They made field trips to the beaches and up the Hudson. Rose D'Attilio said "they were adventures of discovery that carried them into the fresh air and the green countryside". The children went along too.





Gradually shell gathering accounts by members in faraway places were in the Notes, the membership grew - Bill Old was President one year. Famous names in the shell world were on their membership list - and came to them as speakers. They had a long list of clubs with which they exchanged publications - there were stories about fabulous auctions. There is a recurring story every year about one member having "one more - but his last - auction". Altogether the "NOTES" are very much like our own Festivus. Shell collectors just must have a lot in common. Your editor read two volumes with great enjoyment. (B.B.)

P.S. When they had had their hundredth meeting they noted that Anthony D'Attilio had a perfect attendance record.

DISTINGUISHING BETWEEN COLLISELLA SCABRA (GOULD 1846) AND  
COLLISELLA CONUS (TEST 1945)

Collisella scabra and C. conus are often found living in the same areas at the same tidal level -- rocks in the upper midtidal. From the outside it is impossible to distinguish some specimens of conus (max. length 19mm.), from juvenile scabra (max. length 34mm.) The two species are often confused in collections. However, conus interiors are always very glossy, usually with a central dark brown area, whereas scabra is never glossy inside, but dull and uneven. Please check your local material.

A young shell-collector named Jonas  
Found limpets a terrible onus,  
Till, abracadabra  
He found in some scabra  
He had conus as well, as a bonus!

NEW MEMBERS

Mrs. Harold C. Kenney  
2805 Bibb St.  
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Saipan Shell Club  
% Mrs. Larry Brundy  
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Saipan, Mariana Islands 96950





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THE

# FESTIVUS

## SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968

Museum of Natural History - Third Thursday - 7:30 P.M.

President: Clifton Martin  
Vice President: John Michel  
Recording Secretary: Clifford Martin  
Corresponding Secretary: Jeanne Pisor  
Treasurer: Kay Taylor  
Editor: Blanche Brewer

ANNUAL DUES: Single membership, \$3.00 - Family, \$4.00 - Corresponding membership, \$2.50 - Overseas mailing, \$3.50. Payable to San Diego Shell Club, 2437 Aster St., San Diego, Calif. 92109.

Vol. III

February 1972

No. 2

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\* PROGRAM: February 17. \*  
\* FILM - A DECADE OF DISCOVERY (in oceanographic research) \*  
\* 1972 membership dues are now payable. \*  
\*\*\*\*\*

### IDENTIFY YOUR OPISTHOBRANCHS

By David Mulliner

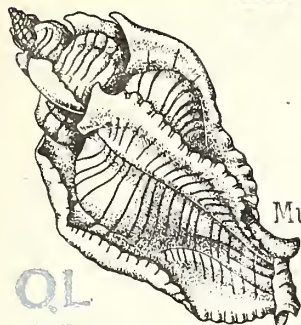
Phylum Mollusca, Class Gastropod. The veligers as they develop will undergo torsion, bringing the gills, anus, and mantle cavity to the front. The nervous system is twisted into a figure eight. The subclass Prosobranchia will mature this way, while the subclass Opisthobranchia will undergo detorsion, untwisting the nervous system and return toward bilateral symmetry. The opisthobranchs have a single auricle and one or no ctenidium, often with surface gills, and a strong tendency toward shell reduction.

The identification of an opisthobranch can be started by placing the animal in the proper "Order" from a general list of characteristics

"Order Cephalaspidea". Opisthobranchs with a ctenidium and usually with a shell, male genital groove open, with a cephalic shield, usually with a gastric shield for grinding. Example: bubble shells.

"Order Anaspidea". Opisthobranchs with the shell poorly developed or missing, with well developed natatory parapodia, male genital groove open, with several gastric shields and a large radula with medium tooth, ctenidium and jaws, visceral hump attached along the foot. Example: Aplysia

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"Order Sacoglassa". Jawless, herbivorous opisthobranchs with rhinophores, with one series of teeth in sac, male genital groove closed. Example: Styliger, Lobiger.

"Order Nudibranchia". Opisthobranchs without a shell in adults, with visceral mass attached along the foot, without parapodia, with male genital groove closed over. Example: Dorids; Eolids.

"Order Notaspidea". Opisthobranchs with the shell usually internal, without parapodia or gastric shield, but with some chitinous spines, with a gill, male genital groove closed over, radula variable. Example: Pleuobranchia.

Seventy species of Opisthobranchs were illustrated with 35 mm slides of the living animals. Brilliant colors are displayed in the cerata of many Eolids: these appendages contain the liver of the animal. The coelenterate feeding Eolids also translocate the stinging cells to cnidosacs in the cerata where they act as protection. The Dorids are flat with rhinophores projecting from the notum in front and secondary gills projecting near the posterior end.

The variety of opisthobranchs seems almost endless. It seems amazing to the observer how many animals we have right on this coast. Much work needs to be done and published before we will begin to understand this group. Very little is published of the feeding, reproduction, veliger development, growth rates, life cycles, and range of each species.

#### NUDIBRANCH DICTIONARY

BRANCHIA - secondary gills

CERATA --- combination respiratory and digestive organs, located on back and sides of notum, sometimes contain protective devices.

CTENIDIUM -gill comb. - part of respiratory system -  
(c is silent)

NOTUM ---- animal is in two sections, the foot and the upper portion which is the notum.

PARAPODIA -protective flap, sometimes taking many forms and performing many functions.

RHINOPHORES-chemo-tactile sensory organs, anterior placement.





Written in 1969 - By Barbara Myers

Down to the tidepools at break of day,  
Scrambling and splashing on their way,  
Buckets and pails clinking and clattering,  
All of them excitedly chattering,  
Vhing with the ocean's roar,  
Whatever are they looking for?

Triopha carpenteri, Chioraera leonina,  
Laila cockerelli, a species of Cadlina,  
Aldisa sanguinea, Dialula sandiegensis,  
Aglaja diomedeae, Archidoris montereyensis,  
Hermisenda crassicornis, Dirona and Cratena  
Navanax inermis, Fiona and Tylodina.

Amid exultant shouts, this was what I heard,  
To me it made no sense, not a single word.  
I came to the conclusion, they were strange indeed,  
They must be the "Nudi" people, a very special breed.

(We are hoping to receive permission of Joan E. Steinberg, of the University of California, Berkeley, to publish her key to the more Common Opisthobranchia. If such permission is granted, we will publish it in our next issue).

## ISOLATION AND DIVERGENCE

Mae Dean Richart

The subject of isolation and evolution covers a branch of zoogeography, the science concerned with the distribution of animals in terms of the mutual relation between organisms and their environment. It includes the effect of isolation on the emergence of new species by means of development of divergent characteristics among animals that have become separate from earlier populations of the ancestral stock; characteristics so different that important evolutionary change takes place.

As a general rule two animals are considered to be of the same species if they can and do interbreed. When two populations, originally of the same species, are geographically isolated and eventually develop different characteristics that preclude or inhibit interbreeding, each is considered to be a distinct species. Such divergent characteristics of evolutionary importance are generally changes in form and function of the body and its parts. Though in some cases, important changes may be primarily behavioral. Each isolated group will gradually develop characteristics that best enable them to cope with their differing environments. Those individuals best adapted to their environment will probably live longer, remain healthier and have a larger number of offspring which inherit these favorable adaptations. Those individuals with fewest favorable adaptations will compete unsuccessfully with the better adapted individuals, will not live as long, not remain as healthy and probably will produce fewer offspring. Over many thousands and millions of years the better adapted individuals in





each population will completely supplant the more poorly adapted ones, eventually producing a similar but different characteristic in each population. At a given point in this process, when individuals from one population will not interbreed with their counterparts from the other population two distinct species are said to exist.

Among mollusks, when important changes in form and function of the body and its parts take place they may be accompanied by changes in the shell: a change in the appearance of the shell may indicate important changes in the anatomy. As an example of change in behavior, one group may spawn at only one temperature and a second group only at another.

A major influence in the development of divergent characteristics is the larval form of a given species. When the same or related species appear over great distances, it can be presumed that the animal has a pelagic form for an extended period. Almost all bivalves have these pelagic larval forms. Many gastropods do not.

Some species are found in the shallow waters of many seas. Over a wide geographical range and over a long period of time they have not changed in shell form or conspicuously in internal characteristics. Within that wide range it is probable that environmental conditions such as temperature, salinity and turbidity vary only slightly. It is also probable that the species has a long-lived pelagic larval form. For example, Cymatium pileare Linnaeus is found from the Caribbean through the Indo-Pacific.

In some cases species are distributed throughout a wide range but groups of individuals have drifted, as larvae, on ocean currents into environmental pockets where the local conditions vary greatly from the general conditions of the range. And to where they have become isolated from other populations of the species. Individuals with suitable characteristics have survived and become inbred. Eventually, over a period of many generations they may develop into a species distinct from the parent species. Sometimes distinctive changes in the shell occur although the existence of important changes in anatomy or behavior cannot be verified. This leads to differences of opinion among the experts, regarding the existence of new species.

Sometimes the shell difference is not at all regarded as evidence of a new species: for example when the difference is merely one of size; Murex cornucervus from the Northwest coast of Australia is much larger than the same species from the North east coast. A difference in color may be due to a difference in diet.

Some species spend their entire lives (not merely the larval stage) floating on the surface of the ocean, being carried by the currents. The wide distribution of these pelagic species and the small likelihood of their being isolated has inhibited the development of new or divergent characteristics, for example, Janthina janthina Linnaeus, 1758.

One cause of isolation has been the occurrence of geological events in past ages which divided the populations of species. For example at one time there was one or more natural openings through the Isthmus of



Panama. When the opening (s) closed several million years ago new species developed from populations that were isolated on either side of the land barrier: example, Strombus gracilior Sowerby 1825 on the Pacific Coast and Strombus pugilis Linnaeus, 1785, its Atlantic analogue.

In contrast to divergence, there are cases of convergent evolution; Species with little or no evidence of anatomical relationship, with quite different ancestry, possibly living in the same habitat, have for reasons of survival developed some very similar characteristics. Among molluscs this may take the form of similar shells, as for example in Conus nux of the Family Conidae, Superfamily Conicea, Suborder Toxoglossa and Paramentaria duponti of the Family Colubellidae, (Pyrenidae), Superfamily Buccinacea, Suborder Stenoglossa.

At this point I wish to thank Dr. Radwin for assistance with the foregoing and to absolve him completely from any responsibility for my conclusion.

Allowing Emerson to have the last word: "The individuals at the extremes of divergence in one race of men are as unlike as the wolf to the lapdog. Yet each variety shades down imperceptibly into the next, and you cannot draw the line where a race begins or ends. Hence every writer makes a different count".

#### IN MEMORIAM

LEO GEORGE HERTLEIN, Curator of Geology, Emeritus, died on January 15 after a brief illness. Born in Pratt, Kansas in 1898, he graduated from the University of Oregon in 1922, and obtained his graduate degrees from Stanford University (A.M., 1923; Ph.D., 1929). He was employed at the Academy from 1925 until his retirement in 1970, at which time he was the senior member of the staff.

Dr. Hertlein was universally esteemed among his scientific colleagues. He was author or coauthor of more than 150 scientific papers, many of them of monographic scope. After his retirement from the Academy, he was just as diligent in pursuing his lifelong scientific interests as before.

His publications will testify to his ability and devotion as a scientist. What his friends and associates will long remember are his friendliness, his quiet kindness, his willingness to take time out from his busy schedule to help a colleague, a student, even the veriest amateur who had a question to ask. His work will go on, and there are many young scientists who will gratefully remember his helpfulness another half-century in the future.

Robert C. Miller  
Senior Scientist  
California Academy of Sciences

January 18, 1972





"Shell Diving for Sharks off Santa Barbara" by John Phillips  
Island Specimens  
320 West Cabrillo Blvd.,  
Santa Barbara, Calif.,  
93101

After 20 years of diving for rare shells at various spots around the globe, I can safely state that there is nothing in this world that can strike the bell of fear in my heart like the simple cry of "Shark", or the actual sight of one of these sleek killers underwater. I have personally had several very close calls with Tiger Sharks in the Philippines, so I think that I can vouch for that incomparable feeling of stark terror that can grip the very soul of an individual who is threatened by one of these dreaded fish. The following experience could and probably has happened to many of you readers. I write this tale for the well-being of any individual who does not share the particular degree of respect that I have for all sharks. Draw your own conclusions, but at least take the time to read my story.

My tale begins in mid-July of 1971 at Santa Barbara, California. For a week the newspapers had carried a story about a commercial Abalone diver who was viciously attacked by a 12 foot Great White Shark at Purisima Point, near Vandenberg Air Force Base at Lompoc, California. The above mentioned diver was picking Red Abalones (Haliotis rufescens) from under low ledges in approximately 20 feet of water at the Surf Beach area of Purisima Point when he was suddenly grabbed by the top of his head by the shark and violently pulled off the ocean floor. Luckily, and probably by the grace of God, the diver never lost his head (either literally or figuratively speaking), and he thought fast enough to fend off the monster with his right hand. This man lived to tell his tale, and today he is once again diving for Abalone. His only reminders of this grim event are the scars that remain on his body and the haunting memory of that fateful day underwater.

The above "front-page news" tended to set a somewhat gloomy mood in and around Santa Barbara, at least where divers were concerned. It was a slightly overcast day with light breeze from the northwest as my partner and myself headed out of Santa Barbara Harbor on a southerly course towards Carpinteria Reef, which is located between Santa Barbara and Ventura. I had a slight feeling of apprehension regarding diving at that spot because recently some halibut fishermen had netted a giant, 14 foot White Shark here. There were also two specimens of White Sharks netted in shallow water off Port Hueneme and Oxnard; these were over 18 feet in length and weighed about 3000 pounds apiece. At any rate, we did not let the above thoughts plague our "burning desire" to search for shells, and we had high hopes of finding certain species of local shells in abundance at "Carp" Reef. My partner made a few spot jumps at various positions on the reef itself, inside the reef, and outside in deeper water. All jumps proved futile due to lack of visibility as a result of an over abundance of "red tide" or "salmon tide" in the area. These conditions are especially bad when the thought of sharks is in one's mind, especially white sharks; therefore, we decided to move up the line towards Santa Barbara. I made a jump in 45 feet of water at Padaro Cliffs, between Summerland and Carpinteria, and the visibility was at least "workable" (6 feet or so). We



stayed there awhile and collected some lovely Pteropupura trialatus, Maxwellia gemma, Maxwellia santarosana, and Ocenebra foveolata. After what we considered an ample dive in that particular area we pulled the anchor and headed back once again towards Santa Barbara. For some reason or another we decided to make an experimental dive at Ortega Hill, off Summerland (about three miles south of Santa Barbara), as we had positive feelings about finding the "mother-lode" of some rare shell at this spot. We stopped the boat at the outside edge of the kelp in approximately 60 feet of water, and I donned my diving gear, it being my turn to "explore". I can well remember that I had a slight feeling of apprehension as I headed down towards the bottom and into the pea-soup gloom of an excess amount of Red Tide. When I finally reached the bottom I had about 1 1/2 to 2 feet of visibility, and I thought to myself "What am I doing here??" O well, I was there, so I decided to poke around and seek out some hapless mollusks as they foraged about the bottom for food.

When I dive for shells I take with me one shell bag and one commercial Abalone prying bar (this latter implement I use for dislodging certain species of shells from rock reefs and also as a sort of "cane" for pulling myself along the bottom). When I work directly on the bottom I generally hook the measuring tyne of the Abalone bar on kelp hold-fasts or into the bottom itself and pull myself along, much in the fashion of a giant, lumbering Strombus shell. On this particular dive I was nonchalantly "hooking" myself along the bottom with my nose to the ground, and I managed to grope out a few Pteropurpura macropterus and Pteropurpura vokesae. I glanced upward and saw a reef looming up out of the haze, and I prepared to hook my bar over the top and pull myself over it. Suddenly the "reef" began to move slowly backwards and forward, and I came to a grinding halt. My first thought was that I had happened upon a lounging harbor seal, so I moved forward for a closer look. My heart literally stopped as I actually nudged my face mask against a few square feet of light-grey colored "sand-paper" that swayed with the current. I back-pedaled with my swim fins and gave everything in front of me the old familiar "double-take", and it was at that particular point that I recognized the crescent-shaped tail of a huge shark within arms reach. With my very limited visibility I could not even begin to estimate the whole length of this fish, but judging by the girth of what I could see, I could definitely tell that it was a very large shark. I suppose that he saw me or at least sensed my presence, because he suddenly whisked off into the gloom, leaving me alone in a state of semi-shock. Man, I was scared plenty, and I imagine that the loud, booming noise I heard was my feeble heart pounding. What to do? Well, there was no place to hide down there, so I turned around and began following my air hose back to the boat, which was approximately 300 feet away. Three times I saw the giant shark cruise past me in the haze just outside my range of vision. It was no more than a giant shadow, so I still cannot estimate his length.

Needless to say, I would not be able to write this article if that fellow had captured me, so I will be completely content to end my tale by saying that I safely made the swim back to the boat, a trifle older and alot wiser. The moral to my story is a simple warning to the sheller not to dive in dirty water, especially if he or she has a weak heart!!!





## MINUTES - JANUARY 20

Vice-president John Michel introduced David Mulliner, our speaker for the evening. Dave showed slides of all the members who were present at the annual Christmas party. He also showed many slides of nudibranchs and opisthobranchs. Dave passed out papers to all present showing the Classification of Recent Molluscs of the sub-class Opisthobranchiata. He also explained the method he uses to photograph nudibranchs and also where to look for them. Some are found in intertidal tide pools but many are found only in deep water. Some of the opisthobranchs have shells. Among those with shells are Acteon, Acteocina, Umbraculum, Aplysia, Tylodina and many others.

Many of the nudibranchs shown are new to science and have not yet been named. Dave displayed the latest publications on the nudibranchs along with several live specimens for the members to see. He also brought a microscope for viewing the smaller specimens and had a set-up of his photographic equipment to demonstrate how it is used.

A note from the Western Society of Malacologists president, Beatrice Burch, was read requesting the active participation of our Club in the annual meeting of the W.S.M. which will be held at Redlands University in June.

Anthony D'Attilio brought two trays of shells from the Canal Zone which were donated to the Club. They were distributed by drawing numbers after the regular shell drawing was held.

The membership voted to donate the sum of \$50.00 to the Veliger this year to help defray the rising cost of publication.

Emma West and Jeanne Pisor volunteered to bring cookies to our February meeting.

Clifford A. Martin  
Recording secretary.

## CHANGE OF ADDRESS

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10373 El Honcho Pl.  
San Diego, Calif. 92124  
279-9342

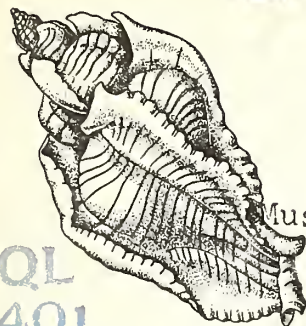


THE

# FESTIVUS

## SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968



Museum of Natural History - Third Thursday - 7:30 P.M.

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Vol. III

March 1972

No. 3

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\* PROGRAM: March 16 \*  
\* TINY TREASURES FROM SPONDYLUS WASHINGS - Bert Draper \*  
\*\*\*\*\*

### MINUTES, February 17

Vice-president John Michel presented the program for the evening - two films produced by the United States Navy, both of particular interest to shell collectors. The first film, "Decade of Discovery", showed the deep sea submergence vessels presently used by the Navy. Their scientific usefulness was demonstrated as was their use in deep water recovery and exploration operations. Some of these vessels are capable of diving to extreme depths.

The second film was about poisonous and venomous sea animals, many of which could be of great danger to the unwary shell collector. Of particular interest was a scene of a cone shell injecting it's poison dart into a small fish and then eating the fish.

The president announced that since our annual Club auction is traditionally held in May the members should start bringing in good specimen shells with accurate data at our regular meeting in March. Any member of the Board is authorized to accept these shell donations.

Waneta Ames made the motion for the Club to purchase a copy of the new Australian shell book, a copy of which was shown by Art West, for our Club library. The motion was seconded and passed.

Clifford A. Martin

### MEMBERSHIP DRIVE

Attention all members. In order to receive your April issue your dues must be paid by the 20th of March. Dues rates and mailing address .





Many years ago when they were dredging the Pacific outer channel to the Panama Canal, all the local shell dealers imported their pink murex from Panama. For the 10 years after they stopped dredging, we were unable to get any quantity of the pink murex.

Then a little old dried up Mexican appeared on the scene and offered to supply us with pink murex from Lower California at a reasonable figure. All of us gave him substantial orders, and he produced very good pink murex for about two years. They were shipped to us at Los Angeles Harbor, and we were all very well satisfied. They came up on a Mexican steamer and were carried on deck because of the odor. One day, when the steamer was coming up the coast, the sailors on board were celebrating the fiesta of the Cinco de Mayo. They all became gloriously drunk. During the hilarity, they tore off all of the tags from the bags so that the skipper did not know which bags went to whom. He had a list stating that each customer was to receive a certain number of bags. So, indiscriminately, he sent the right number of bags to each customer. My allotment was 20 bags, which I received. I did not have time to clean them so I covered them with canvas and let them sit until I had time to prepare the five bathtubs of purex to clean them.

Before I got around to cleaning them, customs officers appeared and made me dump each bag, and they went over every shell very carefully but found nothing - fortunately. Then they wanted to know the name of the producer and the names of any other customers he supplied. They were very grateful but told me not to clean the shells until they gave me their permission, and they would give me no further information. In the meantime, the Long Beach shell dealer had put his murex into purex to clean them, and several little waxed leather pouches came out of the shells. They were filled with a brown paste. He took one to the drugstore and found it was crude opium and immediately reported it to customs. The customs officers came over to his place and inspected the rest of the shells he had and found in the larger shells five more leather pouches tucked into the shells with the operculum glued over the top.

The old Mexican always came up in person to collect for the shells. I paid him and told him that the customs officers had been here and inspected all the shells, and I asked him what it was all about. He said he did not know. I later found out that he went no further up the coast but went back into Mexico and disappeared.

The Mexican authorities cooperated with the U.S. Customs, but they were never able to find the old Mexican. I was under surveillance for more than a year, and they inspected every shell I received. During this time they told me that the opium had been coming in from Mexico, but they could not find the source until they discovered the supply inside the pink murex.

For two years we were without pink murex. In the meantime I wrote many letters in Spanish to everybody I could think of in Lower California to find out if there were any pink murex and who could produce them. There were no results. At the end of three years, I went into Lower California to find pink murex but met with a lot of opposition. All I had to do was mention pink murex and they would clam up and give me no information. I finally found some at El Cayote, and once again I got some Mexicans to produce pink murex, and they have been producing it ever since. For the first year every shell was inspected, but nothing was ever found. And since then we have never had any difficulty.



By Carole M. Hertz

Now available for circulation in our library is Jean Andrews' Sea Shells of the Texas Coast, University of Texas Press. This is a Club purchase and a most worthwhile one.

Included in the main section of this book are over 360 beautiful black and white photographs, and many line drawings, which are excellent aids to identification. The descriptions, in outline form, are concise and include habitat, range, pertinent remarks and even (for this Non-Latin and Greek scholar) a brief explanation of the meanings behind the names of the shells.

Besides the shell descriptions, the book has an interesting section dealing with the historical background of the Texas coast from the 1500s to the present, giving the reader a glimpse of the explorations, battles and tribal life of the past. This is followed by a chapter giving information on the physical aspects of the area--descriptions of the coastal waters, the flora and fauna and Indian artifacts found there.

In part II of the book, in addition to maps of the areas discussed, there are short sections on beachcombing, with illustrations and explanations of items likely to be found by the inveterate "picker-upper of treasures" both animate and inanimate from Renillas to Naval flares. Also to be found are recipes using local mollusks and fish and aquarium and photographic pointers.

Besides being a valuable book for those who collect in the Texas area, it is a book to be enjoyed "just for the reading." If you hadn't planned on visiting the Texas coast, you might decide to change your plans!

Our library has also added several other publications in the last month which will be available for circulation at our March meeting. They are as follows:

New York Shell Notes, Vol. V, Jan. 1970 - Dec. 1971 - as yet unbound.

Of Sea & Shore, Vol II, no. 4 - Winter 1971

An Upper Pleistocene Marine Fauna From Mission Bay, San Diego, Calif.

by J. Philip Kern, Tom E. Stump and Robert J. Dowlen, Transactions of the San Diego Society of Natural History, Vol 16, no 15. 29 Dec. 1971.

The Systematic Position of Urosalpinx carolinensis Verrill, 1884 With Comments on the Genus Mohnia Friele, 1878 by George E. Radwin, Transactions of the San Diego Society of Natural History, Vol. 16, 12 Jan. 1972.

Muricacean Supraspecific Taxonomy Based on the Shell and the Radula, by George E. Radwin and Anthony D'Attilio, reprinted from THE ECHO No. 4 1971. Donated to the library courtesy of the authors.

American Malacological Union Newsletter, Winter 1972





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A reminder to our members. Enjoy and use the Club library. That is its reason for being. But remember that books are due the month following checkout. Please bring your books back promptly. Others may be waiting to read them!

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#### AN APOLOGY

Corrections to the January 1972 issue of the Festivus

The article, "Distinguishing Between Colisella scabra and Colisella conus", lacked the names of the authors, Susan and Martin Bishop. Our apologies!

"Mariculture of Abalone" was not written by the speaker, Dr. David Leighton, but was taken from the minutes of Clifford A. Martin.

#### A REMINDER TO CALIFORNIA COLLECTORS

If you have not yet purchased your 1972 fishing license, remember that a valid license is required for any marine collecting. Cost is \$4.00 this year. It may be purchased at any sporting goods or diving shop.

#### NEW MEMBERS

Mr. & Mrs. Harold Bellmer  
4680 W. Talmadge Dr.  
San Diego, Calif. 92116  
284-5369

Mr. John E. Smith  
10779-C  
Via Alberto  
San Diego, Calif. 92120

Mr. & Mrs. Richard Schwarz  
7623 Blue Lake Dr.  
San Diego, Calif. 92119



## PHYLUM MOLLUSCA

## SUBCLASS OPISTHOBANCHIA

In this group detorsion has occurred, bringing the anus and the ctenidium (if present) back to the right side or to the rear of the body, and "untwisting" the nervous system to the euthyneurous condition. Opisthobranchs are hermaphroditic, exclusively marine, and show a marked tendency to reduce the shell, which is often completely buried in the mantle in the order Tectibranchia and absent in the order Nudibranchia, except in larval stages. The opisthobranchs are characterized by a striking variety of form, color, and habits, but are difficult to preserve satisfactorily. Positive identification is often a matter of some difficulty, and only the more common forms are included in the following key.

## Key to the More Common Opisthobranchia

by Joan E. Steinberg  
University of California, Berkeley

1. Shell present or absent; a series of gills (representing a true ctenidium) present within a mantle cavity on right side or dorsally; a pair of enrolled or tubular rhinophores usually present anteriorly. . . . . Order Tectibranchia 2
1. Shell absent; true ctenidium absent but body usually provided with dorsal processes and/or secondary gills (branchiae); anterior part of dorsum usually bears a pair of rhinophores; exceedingly diverse in color, form, and size. . . . . Order Nudibranchia 5
1. Small, flattened, lacking shell; resembling a shell-less limpet; color dark brown with pattern of alternating dark and light patches on margin; sometimes considered a pulmonate, but more likely an offshoot of the Opisthobranchia . . . . . *Oncidiella* (= *Arctonchis*) sp.
2. Shell present and more or less exposed. . . . . 3
2. Shell either absent or completely buried in mantle. . . . . 4
3. Shell oblong with conical spire; spirally grooved; color white with revolving black lines . . . . . *Acteon punctocoelata*
3. Shell thin, spire sunken, rather transparent, partly hidden by mantle. . . . . *Haminoea* spp.
4. Small, bluish black; no conspicuous external flaps or tentacles; found burrowing in surface of sand flats. . . . . *Aglaja diomedea*
4. Medium sized (2 in.); green with black longitudinal striping; pointed posteriorly; tentacles and parapodial flaps not pronounced; characteristically found on broad-leaved eelgrass (*Aostera*) . . . . . *Phyllaplysia taxlori*
4. Large, sometimes reaching 15 in.; brownish to greenish; 2 large parapodial flaps more or less covering back; 2 cephalic tentacles, 2 rhinophores that stand up like ears (sea hare). . . . . *Tethys californica*
5. With a circlet of gill-like branchial plumes about anus on posterior dorsal surface; rhinophores present (fig. 120, a); other dorsal processes may be present or absent . . . . . 6
5. Without a circlet of branchial plumes on posterior dorsal surface; anus often on right side of body; rhinophores usually present (fig. 120, b); other dorsal processes may be present or absent. . . . 19





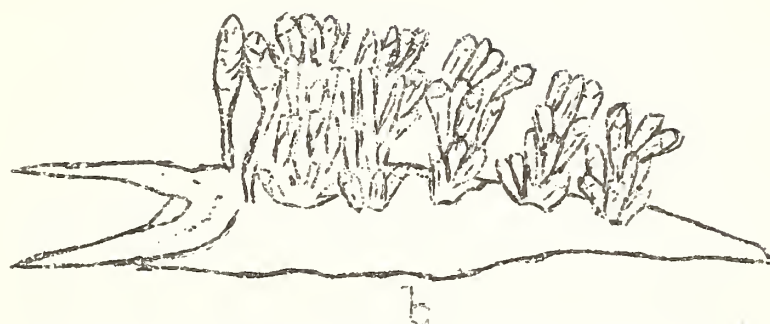
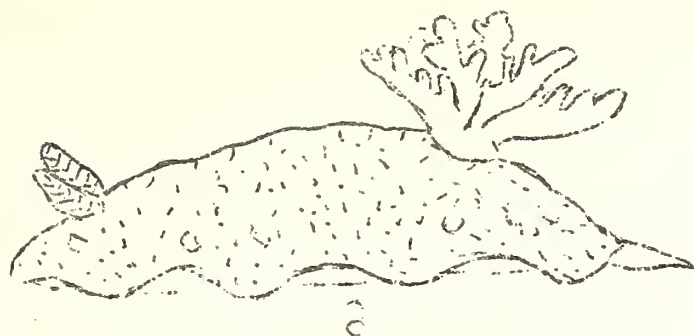


Fig. 120. a, a typical dorid nudibranch; b, *Hermisenda crassicornis*.

6. Branchial plumes fully retractile beneath the body surface; lacking elongate processes on dorsum; body oval and somewhat flattened. . . . . 7
6. Branchial plumes contractile but not retractile beneath the body surface; usually with dorsal processes on body. . . . . 14
7. Mouth opening porelike; body yellow with small contrasting white spots . . . . . *Dendrodoris fulva*
7. Mouth opening a vertical slit or inverted T in shape; body yellow or not yellow, but without contrasting white spots. . . . . 8
8. Color red; mature specimens typically less than 2 cm. in length 9
8. Color not red; mature specimens more than 2 cm. in length . . . 10
9. Two black spots on back, 1 in front of branchiae and 1 behind rhinophores . . . . . *Aldisa sanguinea*
9. No conspicuous black spots; often found on red sponges, which it matches closely in color. . . . . *Rostanga pulchra*
10. Dorsal surface velvety in appearance, without obvious tubercles . . . . . 11
10. Dorsal surface set with distinct tubercles. . . . . 12
11. Dark brown or black rings on dorsum; ground color whitish to dark tan . . . . . *Diaulula sandiegensis*
11. Seven to 10 lemon-yellow spots on each side of dorsum; ground color whitish; rhinophores dark . . . . . *Cadlina flavomaculata*
12. Color whitish; dorsum with low tubercles, each tipped with lemon-yellow; margin and foot edged with yellow . . . *Cadlina marginata*
12. Color yellow to orange, with darkly pigmented areas . . . . . 13
13. Dark pigment both on dorsum and on tubercles; oral tentacles ear-shaped and grooved externally; branchial plumes dingy yellow. . . . . *Archidoris montereyensis*



13. Dark pigment only on dorsum, not on the tubercles; oral tentacles fingerlike; branchial plumes whitish . . . . . *Anisodoris nobilis*
14. Body elliptical and flattened; numerous tapering dorsal processes in addition to branchiae; color vivid rose-pink. *Hopkinsia rosacea*
14. Body elongate and sluglike, sometimes humped; usually with a frontal veil bearing short processes . . . . . 15
15. Body humped; striped longitudinally in black and gray, with yellowish spots; 4 pointed anterior processes. . . . . *Polycera atra*
15. Body not striped: usually with numerous dorsal processes . . . . 16
16. Body white; markings dark brown or orange. . . . . 17
16. Body orange to brownish, with or without bluish spots. . . . . 18
17. Dorsal surface thickly set with short, blunt, white tubercles; usually with dark brown spots on body between tubercles. . . . .  
     . . . . . *Aegires albopunctatus*
17. Middorsal region set with low white tubercles; dorsolateral margin set with club-shaped white processes tipped with orange. . . . .  
     . . . . . *Laila cockerelli*
17. Dorsum and sides set with low orange tubercles; dorsolateral margins set with longer orange processes. . . . *Triopha carpenteri*
18. Body orange to dark brown with bluish spots that may be inconspicuous in young, making them appear uniformly orange; branchial plumes orange-red; dorsolateral processes entirely orange-red; usually found in tide pools . . . . . *Triopha maculata*
18. Body yellowish-brown with or without bluish spots; branchial plumes whitish; dorsolateral processes tipped with orange-red; usually found in beds of floating kelp. . . . . *Triopha grandis*
19. Dorsal processes absent . . . . . 20
19. Dorsal processes present. . . . . 21
20. Body oval, elongate, pointed behind; moderately large; mantle dark red or brown with fine longitudinal white lines; branchiae situated ventrally . . . . . *Armina* (= *Pleurophyllidia*) *californica*
20. Body elliptical, very flat, notched behind; usually about 1 cm. in length; branchiae located posteroventrally on either side of anus; occurs on and closely matches the bryozoan *Membranipora* on floating kelp. . . . . *Corambe pacifica*
21. Dorsal processes branched . . . . . 22
21. Dorsal processes not branched . . . . . 23
22. Dorsal processes consist of a number of separate, small branchial plumes set on 2 longitudinal dorsolateral ridges; a delicate pattern of chalky white lines upon the more transparent dorsum. .  
     . . . . . *Duvaucelia* (= *Tritonia*) *festiva*
22. Dorsal processes large, stout, extensively branched; animals of large or moderate size and extremely soft; oral veil bears branched processes; rhinophores retractile into sheaths which are branched at apex. . . . . *Dendronotus* spp.
22. Dorsal processes palmately branched; head bears 2 palmately branched frontal lobes; animal reddish to greenish-brown with irregular white spots; coloration closely resembles brown algae such as *Laminaria* on which it is frequently found; average length about 2 cm. . . . . *Hancockia californica*
23. Dorsal processes numerous, tapering and pointed . . . . . 25
23. Dorsal processes constricted at base (club-shaped or leaflike), sometimes easily detached . . . . . 24
24. Dorsal processes few, expanded and leaflike; rhinophores absent; animal possesses curious extensible oral hood used in catching food; typically found in kelp beds. . . . . *Melibe leonina*





24. Dorsal processes more numerous (but readily detached), inflated, tuberculate on inner surface, largest ones closest to median line; body translucent reddish-brown with white spots; head expanded into conspicuous undulating anterior veil. . . . . *Dirona picta*
24. Dorsal processes club-shaped, not tuberculate, tipped with white; dorsal surface of body greenish, flecked with brown and white; very small (less than 1 cm.), on *Obelia* and other hydroids . . . . . *Eubranchus* (= *Galvina*) *olivacea*
25. Body purple with rusty-red dorsal processes and rhinophores. . . . . *Flabellina iodinea*
25. Body whitish; dorsal processes in 4-5 distinct clusters, translucent gray with brown cores and subterminal orange rings; opalescent blue line runs down median line from oral tentacles, bifurcating 2-3 times to enclose orange areas (fig. 120, b). . . . . *Hermisenda crassicomis*
25. Body brownish to pinkish; dorsal processes slightly flattened, grayish brown, tipped with white; not in distinct clusters but cover dorsolateral surfaces like a shaggy coat. *Aeolidia papillosa*

## List of Opisthobranchia

(Classification of nudibranchs follows O'Donoghue, 1926)

## Order Tectibranchia

*Acteon punctocoelata* (Carpenter, 1964)*Aglaja diomedea* (Bergh, 1894)\**Llaminœa vesicula* (Gould, 1855)*Haminœa* sp.\**Navanax inermis* (Cooper, 1862)*Phyllaplysia taylori* Dall, 1900\**Pleurobranchus californicus* Dall, 1900*Tethys californica* (Cooper, 1863)

## Order Nudibranchia

## Section Sacoglossa

Tribe Holohepatica (= Doridacea) (Liver in a single mass)

## Superfamily ZONOBANCHIATAE

\**Duvaucelia exsulans* (Bergh, 1894)*Duvaucelia* (= *Tritonia*) *festiva* (Stearns, 1873)\**Duvaucelia tetraquetra* (Pallas, 1788)

## Superfamily CRYPTOBRANCHIATAE (Branchiae retractile into permanent pockets)

*Aldisa sanguinea* (Cooper, 1862)*Anisodoris nobilis* (MacFarland, 1905)*Archidoris montereyensis* (Cooper, 1862) (One of the commonest nudibranchs on this coast; often associated with the sponge *Halichondria*)*Cadlina flavomaculata* MacFarland, 1905*Cadlina marginata* MacFarland, 1905*Dendrodoris* (= *Doriopsis*) *fulva* (MacFarland, 1905)*Diaulula sandiegensis* (Cooper, 1862)\**Discodoris heathi* MacFarland, 1905\**Glossodoris* (= *Chromodoris*) *californiensis* (Bergh, 1879)\**Glossodoris* (= *Chromodoris*) *porterae* (Cockerell, 1902)*Rostanga pulchra* MacFarland, 1905



Superfamily PHANEROBRANCHIATAE (Branchiae not retractile into permanent pockets)

- \**Acanthodoris brunnea* MacFarland, 1905
- \**Acanthodoris columbina* MacFarland, 1926
- \**Acanthodoris hudsoni* MacFarland, 1905
- \**Acanthodoris lutea* MacFarland, 1926
- Aegires albopunctatus* MacFarland, 1905
- \**Ancula pacifica* MacFarland, 1905
- Corambe pacifica* MacFarland and O'Donoghue, 1929
- Hopkinsia rosacea* MacFarland, 1905
- Laila cockerelli* MacFarland, 1905
- Polycera atra* MacFarland, 1905
- Triopha carpenteri* (Stearns, 1873)
- \**Triopha catalinae* (Cooper, 1863)
- Triopha grandis* MacFarland, 1905
- Triopha maculata* MacFarland, 1905
- Tribe Cladohepatica (= Aeolidiacea) (Liver divided and in most families ramified)
- Aeolidia papillosa* (Linnaeus, 1761)
- Armina* (= *Pleurophyllidia*) *californica* (Bergh, 1862)  
(Modified for a burrowing life in sand; often obtained by dredging)
- \**Dendronotus giganteus* O'Donoghue, 1921 (One of the largest nudibranchs on this coast. Like others of this genus it is capable of swimming short distances by an undulating motion of the body.)
- Dendronotus* spp.
- \**Dirona albolineata* MacFarland, 1912
- Dirona picta* MacFarland in Cockerell and Eliot 1905
- Eubranchus* (= *Galvina*) *olivacea* (O'Donoghue, 1922)
- \**Fiona pinnata* (Eschscholtz, 1831) (On driftwood bearing gooseneck barnacle colonies; cerata bear branchial membranes)
- Flabellina iodinea* (Cooper, 1862)
- Hancockia californica* MacFarland, 1923
- Hermisenda crassicornis* (Eschscholtz, 1831) (One of the commonest nudibranchs on this coast; occupies widely varying habitats, e.g., rocks, mud, wharf pilings)
- \**Janolus fuscus* O'Donoghue, 1924 (Resembles *Hermisenda crassicornis* but cerata extend in front of the rhinophores)
- Melibe leonina* (Gould, 1853)

Section Ascoglossa

- \**Phyllobranchopsis enteromorphae* Cockerell and Eliot, 1905. (Mouth parts modified for feeding on fluids of algae such as *Enteromorpha*, on which it is found)

Of questionable position:

- Oncidiella* (= *Arctonchis*) sp. (Fairly common on stipes of laminarians, but inconspicuous. For other near-opisthobranchs see p. 263)

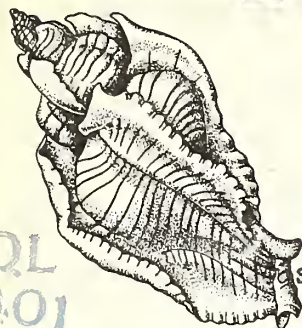
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# SAN DIEGO SHELL CLUB

**FOUNDED 1961 • INCORPORATED 1968**

Museum of Natural History - Third Thursday - 7:30 P.M.

President: Clifton Martin  
Vice President: John Michel  
Recording Secretary: Clifford Martin  
Corresponding Secretary: Jeanne Pisor  
Treasurer: Kay Taylor  
Editor: Blanche Brewer

ANNUAL DUES: Single membership, \$3.00 - Family, \$4.00 - Corresponding membership, \$2.50 - Overseas mailing, \$3.50. Payable to San Diego Shell Club, 2437 Aster St., San Diego, Calif. 92109.

Vol. III

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No. 4

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* PROGRAM: April 20 *
* Dr. George Radwin: The Anatomy of a Book *
* (in which everything that could go wrong does). This will include *
* a preview of the color plates from the new book *
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NOTICE: UPCOMING SHELL AUCTION

Most of you know the auction will be Friday May 19, home of Cliff and Waneta Ames. Problem: We have not received enough shells to support an auction. PLEASE, GET YOUR SHELL DONATIONS TO NEXT MEETING OR TO A MEMBER OF THE BOARD. Shells should be of good quality, with data.

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## TINY TREASURES FROM SPONDYLUS

Our March program, a 'SHELLECTURE' titled, Tiny Treasures from Spondylus, was authored and presented by Mr. Bertram C. Draper of Los Angeles.

(The lecture was taped and Mr. Draper operated the slide projector making added comments as the program progressed.)

For the past fifteen years Mr. Draper's hobby has been the collecting of marine shells of the California West Coast and during most of that time he specialized in the collection of minute shells, shells ten millimeters or less in length. He also combined another hobby, photography, with his shell collecting, specializing in micro photographs, color, of small and minute shells.



Since 1970 he has extended the range of his study and collecting to include shells from the Gulf of California and the Panamic Province. *Spondylus*, of course, are Gulf and Panamic shells.

As a background Mr. Draper told how he happened to have the opportunity to examine the scrapings from the *Spondylus*.

In 1969 Mr. Ralph Ferguson, a wholesale dealer in shells, learned of an extensive bed of *Spondylus princeps* about half-way down the Gulf of California on the west side. Desiring to obtain a supply of these exotic shells Mr. Ferguson went to Santa Rosalia in Baja California, the nearest town to the location of the *Spondylus* beds. They are a short distance southeast of Santa Rosalia in a sheltered area between the Isla San Marcos and the shoreline in about forty feet of water. Mr. Ferguson arranged with commercial divers to gather 2000. They felt this would not thin the beds excessively as they were gathered as food by local divers who consider only the bodies disregarding the shells.

Those gathered for Mr. Ferguson were brought to shore where the bodies were carefully removed, each complete shell tied together with strings, then individually wrapped in newspaper. They were then placed in storage to await Mr. Ferguson's orders for shipment to Wilmington where his business is located.

Early in 1971 one of Mr. Draper's fellow club members, (of the Conchological Club of Southern California) Miss Winifred Wagg, cleaned quite a few of the *Spondylus* for Mr. Ferguson. She gave some of the scrapings to Mr. Draper to examine and he was "amazed and delighted" with what he found. Mr. Draper then arranged to clean several hundred of the *Spondylus* himself and thus obtained several quarts of scrapings.

From these scrapings, with subsequent siftings, Mr. Draper collected 175 species of small mollusks, many of which were represented in the beautiful slides.

Mr. Draper also set up a display of color photographs, greatly enlarged, of the tiny treasures. Each specimen pictured was exhibited in a plastic box just below the color print so comparisons could be made. Mrs. Draper and Mrs. John Q. Burch accompanied Mr. Draper. - Ed.

## A CONVERSATION WITH CHARLENE NEEB

by Carole M. Hertz

Charlene Neeb was involved in ecology and enjoying the marine life in the San Diego area when many of us were still living elsewhere. Mission Bay was undeveloped, Del Mar had a pier (at about 8th St.) and you could walk along the beach from Torrey Pines to Del Mar.

Charlene and her good friend Mrs. Florence Hobbs joined the San Diego Shell Club when it first started. They weren't as interested in collecting then as they were in observing and they went on many outings together. At that time they believed that, "Anything alive had to be put back." Charlene has collected live shells and has a fine collection but she's collected conservatively.





Charlene told me that one of their most exciting times occurred in 1959. They'd taken that walk to Del Mar and were on the beach near the pier. "The (Cypraea) spadicea were so thick we were picking them up and putting them in our skirts - we wore dresses then - to put them back so the kids couldn't get them. The kids were throwing them around." She added that the baby octopus were also "thick" that day and they were busily trying to save them too. On other occasions they found Bursa californica and Kelletia in abundance in this area. Charlene found her first Pteropurpura trialata there -- at 5 A.M. after being out tidepooling since 2 A.M. It was the only one she ever found at that location.

Mission Bay was quite different in 1959. Vacation Village wasn't even an idea and that area was then called Tierra del Fuego. The Aequipece en aequisulcatus were abundant then, darting around in the water. "They'd pop out and we'd put them back." The Calliostoma tricolor were plentiful on the eel grass. One day Charlene collected five--her sum total--and two days later the dredging began. Charlene told me that after the dredging she collected some Aequipecten aequisulcatus from Shelter Island and she planted them in the bay across from Tierra del Fuego - where Shamu's house now sits!!

Quivira Basin was also a great intertidal shell collecting spot then. In the early 1960's you could find, among other species, Calliostoma annulatum, gloriosum and canaliculatum and specimens of Pteropurpura trialata "that were exceptionally beautiful."

I also heard about the time in 1962 that Charlene found a single specimen of Ceratostoma foliata off Shelter Island. Would you believe Ocenebra interfossa in the washed in holdfasts in Pacific Beach at the foot of Loring St.---or how about Maxwellia santarosana in waist deep water off Coast Blvd. in La Jolla?

Then there is the fossil Epitonium chacei collected by Charlene before Harbor Island was dredged. But that's another story.

## SCIENCE FAIR PROJECTS

by Jules Hertz

Located close to the Pacific, it is quite understandable why many of the student projects in the San Diego Science Fairs are ocean related. Whenever possible, the Festivus will report on such projects dealing with molluscan life.

In a recent school science fair, Carol Joyce Frankowski, an eighth grader reported on her experiment using paper chromatography to determine whether or not the dye of the local sea hare, Aplysia californica was composed of a single non-primary color. Her experiment consisted of manipulating the sea hare until the animal inked and collecting the purple dye in a clean test tube. The dye was left over-night and she reported the following results:

"In this test the chromatography worked perfectly and I got the results; red, yellow, orange, and brown colors. I decided to leave



the filter paper in the dye and see if there would be any changes. I left it there for three more days. The red faded to rose and some salt from the salt water had caked on the filter paper at the top."

Although aware of the accepted statement that all colors are made up of the primary colors, Carol was hoping to prove otherwise.

## AQUARIUM OBSERVATIONS

BY Barbara Good

Generally speaking mollusks in the genus *Cypraea* are believed to be herbivorous and to feed on algae. However, from my own observations I have learned that *Cypraea spadicea* can be a definite predator and also a scavenger.

Early in 1971 I placed two *Cypraea spadicea* in my aquarium. At first they appeared to feed on the algae on the sides of the tank. However, one of them soon apparently became bored with this bland diet and went in search of more delectable fare. *Norrisia norrisi* was his first victim. (As observed in the aquarium, this poor snail seems to be preferred by many predators.) After satisfying his hunger on the *Norrisia*, the *Cypraea* became inactive for a while. In the meantime the other *Cypraea* was not observed to be eating anything. In fact, he was inactive and apparently not in the best of health.

One day at Mission Bay during a very low tide I found a good number of *Leptopecten monotimeris* washed ashore alive in seaweed. I took several of this attractive species home and placed them in the aquarium, where they soon attached themselves to the sides of the tank. The sight of these little *Pectens* awoke *Cypraea* number one from his lethargy (caused by a full stomach no doubt), and he immediately attacked the defenseless *Pectens*. In no time at all he had eaten almost every one - fortunately, not damaging the shells, so I was able to save them for my collection.

Shortly after this the second *Cypraea* died one night (or possibly was merely near death). In the morning I found the other one feasting on him! After this I was very careful not to put anything in the aquarium that I was not willing to have serve as *Cypraea* food.

I may be of interest to note that when collected this *Cypraea* had the normal glossy shell of his species. However, when he died, almost a year later, the shell was dull and lusterless. This may have been caused by the fact that his mantle was retracted almost all of the time. Or possibly it was due to the water in the aquarium. Does anyone have any ideas on this question?





CHECK LIST OF SHELLS FOUND IN SCRAPINGS FROM SPONDYLUS PRINCEPS TAKEN AT A DEPTH OF 40 FEET, SOUTHEAST OF SANTA ROSALIA, BAJA CALIFORNIA, 1969. Prepared by B.C. Draper

GASTROPODA

1. Agathotoma (Agathotoma) alcippe (Dall, 1918) 1 juv. - 4mm. K-1816
2. Alaba interruptelineata Pilsbry & Lowe, 1932 2 juv. - 1.5 & 2.5 mm. K-560
3. Alvinia monseratensis Baker, Hertlein, & Strong, 1930 1 adult - 1.8 mm. K-207
4. Alvinia tumida (Carpenter, 1857) 2 adult - 1.4 mm. K-211
5. Anticlimax (Subclimax) willetti Hertlein & Strong, 1951 1 - 1.8 mm. K-419
6. Attiliosa carmen (Lowe, 1935) 7 Juv. - 1.5 to 7 mm. K-1020
7. Balcis gibba Defolin, 1867 K-721 6 - 1.1 to 1.9 mm. Probably adult.
8. Balcis hastata (Sowerby, 1834) 1 very juv. - 0.7 mm. K-723
9. Balcis recta (C.B. Adams, 1852) 6 juv. - 3.7 to 9.0 mm. K-735
10. Barleeia zeteki Strong & Hertlein, 1939 1 adult - 2.6 mm. K-226
11. Calliostoma iridium Dall, 1896 1 - juv. 5.6mm. K-81
12. Calliostoma mcleani Shasky & Campbell, 1964 2 juv. - 1.6 to 2.8 mm. K-86
13. Calyptreaea conica Broderip, 1834 2 juv. - 3.5 mm. K-799
14. Calyptreaea mamillaris Broderip, 1834 1 juv. - 3.5 mm. K-801
15. Calytraea subreflexa (Carpenter, 1856) 7 juv. - 2.5 to 4.0 mm. K-802
16. Cerithiopsis (Cerithiopsis) tuberculoides Carpenter, 1857 About 200 shells - 1.5 to 6.5 mm. K-543
17. Cheilea cepacea (Broderip, 1834) 1 juv. - 9 mm. K-806
18. Clathurella maryae McLean & Poorman, 1971 3 - 5.5 to 6.5 mm. K-1774
19. Crassispira (Crassispira) rustica (Sowerby, 1834) 2 juv. 5 to 7.5 mm. K-1688
20. Crepidula aculeata (Gmelin, 1791) 2 juv. - 3.0 to 4.5 mm. K-808
21. Crepidula striolata Menke, 1851 1 juv. - 5.5 mm. K-820
22. Crepidula lingulata Gould, 1848 10 juv. - 2 to 4 mm. K-817
23. Crucibulum spinosum (Sowerby, 1824) 3 juv. 4 to 7 mm. K-826
24. Crucibulum (Disputaea) subaetum (Berry, 1963) 1 juv. - 4.3 mm. K-831
25. Cymatium gibbosum (Broderip, 1833) 6 very juv. - 2.5 to 7.0 mm. K-961
26. Cypraea (Zonaria) annettae Dall, 1909 1 juv. - 14 mm. K-933
27. Daphnella bartschi Dall, 1919 11 juv. - 2.2 to 6.6 mm. K-1837
28. Daphnella retusa McLean & Poorman, 1971 1 juv. - 9.2 mm. K-1840
29. Diodora inaequalis (Sowerby, 1835) 7 juv. - 1.2 to 7.0 mm. K-18
30. Diodora saturnalis (Carpenter, 1864) About 50 - 3 to 12 mm. K-23
31. Elaphantanellum carpenteri Bartsch, 1920 3 adult - 1.8 to 2.2 mm. K-471
32. Elaphantanellum heptagonum (Carpenter, 1857) 6 - 1.8 to 2/3 mm. Probably adult. K-472
33. Engina jugosa (C.B. Adams, 1852) 4 juv. 4 to 6.5 mm. K-1125
34. Episcynia medialis Keen, 1971 2 juv. - 0.6 to 1.5 mm. K-352
35. Erato columbella Menke, 1847 9 juv. to adult - 21.1 to 5.2 mm. K-912
36. Eulimostraca bartschi Strong & Hertlein, 1937 2 adult - 1.6 to 2.0 mm. K-742
37. Eumetula bimarginata (C.B. Adams, 1852) 1 adult - 6.5 mm. K-552
38. Fusinus fredbakeri Lowe, 1935 1 juv. - 11 mm. aper. broken. K-1348
39. Granulina margaritula (Carpenter, 1857) 3 - 2.0 to 2.3 mm. K-1417
40. Heliacus mazatlanicus Pilsbry & Lowe, 1932 11 juv. - 0.7 to 4.1 mm. K-430
41. Iselica fenestrata (Carpenter, 1864) K-1890 About 180 juv. to adult - 2 to 11 mm.
42. Kurtzia granulatissima (Morch, 1860) 2 nearly adult - 5 to 5.5 mm. K-1813
43. Lamellaria inflata (C.B. Adams, 1852) 1 juv. - 3.7 mm. K-895
44. Leucozonia knorrii Reeve, 1847) 1 juv. - 12.5 mm. K-1337
45. Metaxia convexa (Carpenter, 1857) 1 - 4 mm. K-555
46. Microdaphne trichodes (Dall, 1919) 7 adult & juv. - 2.2 to 3.5 mm. K-1843
47. Mitra (Strigatella) crenata Broderip, 1836 1 juv. - 3.5 mm. K-1423
48. Mitrella dorma Baker, Hanna, & Strong, 1938 1 juv. - 3.7 mm. K-1235
49. Mitrella lalage Pilsbry & Lowe, 1932 3 juv. - 2.2 to 3.5 mm. K-1241
50. Nannodiella nana (Dall, 1919) 1 adult - 4.3 mm. K-1778
51. Nassarina (anassarina) anitae Campbell 1961 5 nearly adult - 6 to 8.8 mm. K-1253
52. Nassarina (Steironepion) melanosticta (Pilsbry & Lowe, 1932) About 100 - juv. to adult - 2 to 4.8 mm. K-1251
53. Nassarius versicolor (C.B. Adams, 1852) 5 juv. - 2.0 to 7.2 mm. K-1314
54. Niso interrupta (Sowerby, 1834) 1 juv. - 3.9 mm. K-750





55. Odostomia (Chrysaliada) clathratula (C.B. Adams, 1852) 13-1.8 to 3.5 mm. K-1903
  56. Odostomia (Chrysaliada) fasciata Carpenter, 1856 37-0.6 to 3.6 mm. K-1919
  57. Odostomia (Ividella) mendozae Baker, Hanna & Strong, 1928 8 - 1 to 3mm. K-1984
  58. Odostomia (Chrysalida) Paupercula (C. b. Adams, 1852) 4 adult - 2 to 3.2 mm. K-1933
  59. Odostomia (Miralda) terebellum (C.B. Adams, 1852) 6 adult 1 to 1.6mm K-
  70. Parviturbo conceptionensis (lowe, 1935) 1 adult - 2.7 mm. K-122
  71. Parviturbo stearnsii (Dall, 1918) 1 adult - 2.8 mm. K-124
  72. Peristichia hermosa (Lowe, 1935) 1 adult - 3.8 mm. K-2020
  73. Philbertia doris Dall, 1919 39 juv. 1.8 to 7.7 mm. K-1843
  74. Polinices (Polinices) uber (Valencien- nes 1832) 1 juv. - 10 mm. K-882
  75. Seila assimolata (C.B. Adams, 1852) 15 juv. to adult - 2.2 to 6.7 mm. K- 557
  76. Seila montereyensis Bartsch, 1907 8 juv. to adult - 3 to 8 mm. (no K no.)
  77. Simun debile (Gould, 1852) 1 juv. - 3.8 mm. K-890
  78. Solenosterira anomala (Reeve, 1847) 35 very juv. - 3 to 7 mm. K-1117
  79. Spilodrilla bratcheri McLean & Poor- man, 1971 4 juv. - 4.8 to 7 mm. K-1637
  80. Strombina angularis (Sowerby, 1832) 26 juv. - 3 to 14.5 mm. K-1265
  81. Tricolia variegata (Carpenter, 1864) 1 nearly adult - 2.5 mm. K-164
  82. Triphora alternata (C.B. Adams, 1852) 22 juv. adult - 2 to 5.6 mm. K-572
  83. Triphora dalli Bartsch, 1907 2 nearly adult - 5 to 6 mm. K-577
  84. Triphora bicolor Bartsch, 1907 39 juv. to adult - 2 to 4.6 mm.
  85. Triphora contrerasi Fred Baker, 1926 1 juv. - 3.1 mm. K-575
  86. Triphora oweni Fred Baker, 1926 42 juv. to adult 2 to 5 mm. K-587
  87. Triphora panamensis Bartsch, 1907 2 adult - 5 to 5.2 mm. K-589
  88. Trimusculus stellatus (Sowerby, 1835) 1 juv. - 4 mm. K-2428
  89. Trophon (Acanthotrophon) carduus K-1041 (Brderip, 1823) 3 juv. - 2.6 to 6.5mm.
  90. Turbonilla (Pyrgiscus) baegerti Bartsch, 1917 1 juv. 2.5 mm. K-2096
  91. Turbonilla (Pyrgiscus) callipeplum Dall & Bartsch, 1909 1 juv. 3 mm. K-2102
  92. Turbonilla (Pyrgiscus) halidoma Dall & Bartsch, 1909 1 juv. 5.2 mm. K-2127
  93. Vermicularia frisbeyae McLean, 1970 8 juv. - 5 to 15 mm. K-447
  94. Volvulella (Volvulella) cylindrica (Carpenter, 1864) 1 juv. - 3.5 mm. K-2250
  95. Williamia peltoides (Carpenter, 1864) 3 juv. - 3 to 4.2 mm. K-2425
  96. thru 104. Turbonilla sps. unidentifi- ed 11 juv. - 1.6 to 4 mm.
- PELECYPODA
105. Amerycina colpoica (Dall, 1913) 1 juv. - 2.5 mm. K-309
  106. Anadara (Rasia) formosa (Sowerby, 1833) 5 pr. juv. - 2 to 8 mm. K-92
  107. Anadara (Scapharca) labiosa (Sowerby, 1833) 6 valves juv. - 2 to 6 mm. K-96
  108. Arca (Arca) pacifica (Sowerby, 1833) 6 pr juv. - 3 to 36 mm. K-67
  109. Asthenothaerus villosior Carpenter, 1864 1 valve juv. - 4.9 mm. K-762
  110. Bornia obtusa (Carpenter, 1857) 1 juv. - 3 mm. K-315
  111. Brachiodontes semileavis (Menke, 1849) 6 pr. 9 valves, juv. 2 to 6 mm. K-122
  112. Chama frondosa Broderip, 1833 1 valve, juv. - 15 mm. K-348
  113. Chama sordida Broderip, 1838 10 valves & prs. juv. to 21 mm. K-350
  114. Chlamys lowei (Hertlein, 1935) 16 pr., 39 valves - to 15.5 mm. K-183
  115. Chione (Chionopsis) amathusia (Phil- ippo, 1844) 1 valve Juv. - 2.5mm. K-448
  116. Chione (Chionopsis) gnidia Broderip & Sowerby, 1829) 2 valves - 7 mm. K-450
  117. Chione (Timoclea) squamosa (Carpenter, 1857) 5 pr, 9 valves - 2 to 6 mm. K-463
  118. Cooperella subdiaphana (Carpenter, 1864) 1 pr. juv. - 3.5 mm. K-485
  119. Corbula (Juliacorbula) ira Dall, 1908 15 valves, juv. - 3 to 5 mm. K-687
  120. Corbula (Carycorbula) marmorata Hinds, 1843 6 valves - 3 to 6 mm. K-676
  121. Corbula (Carycorbula) nuciformis Sow- erby, 1833 2 valves - 4 mm. K-678
  122. Crassinella pacifica (C.B. Adams, 1852) 2 pr., 17 valves - 1.5 to 4 mm. K-234
  123. Crenella divaricata (Orbigny, 1853) 3 pr. 19 valves - 2 to 3 mm. K-131
  124. Ctena chiquita Dall, 1901 1 valve, juv. - 3 mm. K-280
  125. Ctena clippertonensis Bartsch & Reh- der, 1939 3 valves, juv. - 4 to 4.5 mm. K-282





126. Ctena mexicana (Dall, 1901)  
3 valves, juv. - to 6.5 mm. K-284
127. Cyclopecten catalinensis (Willett, 1931)? 3 pr. very juv. 0.5 to 3mm. K-185
128. Cyclopecten pernomus (Hertlein, 1935)  
2 pr., 3 valves - 3 to 3.5 mm. K-190
129. Cymatinoa dubia Deshayes, 1856)  
1 valve - 3.5 mm. K-303
130. Entodesma (Entodesma) inflatum (Conrad, 1837) 1 pr. - 12.5 mm. K-744
131. Felaniella (Zemysia) sericata (Reeve, 1850) 1 valve, juv. - 9 mm. K-295
132. Glycymeris (Tucetona) strigilata (Sowerby, 1833) 1 valve, juv. - 3 mm. K-117
133. Gouldia californica Dall, 1917  
Many valves - 2 to 5 mm. K-383
134. Hiatella arctica (Linnaeus, 1767)  
25 pr. juv. - 2 to 14 mm. K-697
135. Kellia suborbicularis (Montagu, 1803)  
11 valves juv. - 1.5 to 4 mm. K-312
136. Laevicardium elatum (Sowerby, 1833)  
1 valve, juv. - 3.5 mm. K-378
137. Leptopecten velero (Hertlein, 1935)  
2 pr. juv. 3 to 4 mm. K-199
138. Laevicardium elenense (Sowerby, 1840)  
2 valves, juv. - 4 to 10 mm. K-379
139. Lima (Limaria) hemphilli Hertlein & Strong, 1946 3 valves - 3 to 11 mm. K-217
140. Lima (Limatula) similaris Dall, 1908  
1 valve adult - 4 mm. K-218
141. Lima (Lima) tetrica Gould, 1851  
1 pr. juv. - 10.5 mm. K-214
142. Lioberus salvadoricus (Hertlein & Strong, 1946) 1 pr. juv. - 4 mm. K-135
143. Lithophraga (Leiosolenus) spatiosa (Carpenter, 1856) 3 pr. juv. - 5 mm. K-142
144. Lucina (Parvilucina) approximata (Dall, 1901) 2 valves - 2 to 3 mm. K-274
145. Lucina (Pleurolucina) cancellaris Philippi, 1846 1 valve Juv. - 2mm. K-276
146. Lucina (Parvilucina) mazatlanica Carpenter, 1857 2 valves - 2 mm. K-274
147. Macoma (Psemmacoma) siliqua spectri Hertlein & Strong, 1949 1 valve, juv. - 16.5 mm. K-567
148. Modiolus capax (Conrad, 1837)  
1 valve, juv. - 11 mm. K-149
149. Mysella compressa (Dall, 1913)  
1 valve, juv. - 2.7 mm. K-327
150. Mysella umbonata (Carpenter, 1857)  
1 p 1 pr. 7 valves, juv. - 2 to 3 mm. K-330
151. Nemocardium pazianum (Dall, 1916)  
1 valve, juv. - 6.5 mm. K-375
152. Nucula (Nucula) exigua Sowerby, 1833  
4 valves, juv. - 1 to 3 mm. K-5
153. Nuculana (Saccella) elenensis (Sowerby, 1833) 1 valve, juv. - 4 mm. K-23
154. Pandora (Pandorella) granulata Dall, 1915 1 pr. adult - 8.7 mm. K-739
155. Papyridea mantaensis Olsson, 1961  
19 valves, juv. - 1 to 5 mm. K-368
156. Periploma (Periploma) lenticulare Sowerby, 1834 1 valve, juv. - 4.4 mm. K-752
157. Petricola (Petricola) lucasanna Hertlein & Strong, 1948 1 valve, juv. - 5 mm. K-752
158. Pitar (Pitar) perfragilis Pilsbry & Lowe, 1932 1 valve, juv. - 3 mm. K-40
159. Plicatula inezana Durham, 1950  
5 valves, juv. - 5 to 16 mm. K-207
160. Plicatula penicillata Carpenter, 1857  
4 valves, juv. - 8 to 11 mm. K-208
161. Podomesus (Tedina) pernoides (Gray, 1853) 2 valves, juv. 3 mm. K-228
162. Pseudochama corrugata (Broderip, 1835)  
1 valve, juv. 12 mm. K-355
163. Pseudochama panamensis (Reeve, 1847)  
7 valves, juv. - to 23 mm. K-358
164. Pteria sterna (Gould, 1851)  
5 pr. juv. - 7 to 35 mm. K-161
165. Semele verrucosa Morch, 1860 9 valves, juv. - 3 to 6 mm. K-652
166. Spondylus princeps unicolor Sowerby, 1847 5 pr. very juv. - 3 to 7 mm. K-212
167. Tellidorella cristulata Berry, 1963  
2 valves juv. to adult - 1.4 to 4.5 mm. K-236
168. Tellina (Angulus) amianta Dall, 1900  
2 pr, 10 valves, juv. - 3 to 6 mm. K-508
169. Tellina (Angulus) recurvata Hertlein & Strong, 1949 1 pr. juv. - 4 mm. K-518
170. Trachycardium (Phlogocardia) belcheri (Broderip & Sowerby, 1829) 1 valve, juv. - 4.8 mm. K-365
171. Transennella modesta (Sowerby, 1835)  
1 valve, juv. - 4 mm. K-394
172. Trigonocardia (Americardia) biangulata (Broderip & Sowerby, 1829) 2 valves, juv. - 3.7 mm. K-370

#### POYPLACOPHORA

173. Lepidozona elenensis (Sowerby, 1832)  
13 juv. to adult - 2.5 to 7.5 mm. K-33

#### SCAPHOPODA

174. Siphonodentalium quadrifissatum (Pilsbry & Sharp, 1898) 1 shell, apical portion only, - 2.5 mm. K-17
175. Cadulus sp. Broken off above aperture, appears to have two apical notches. 4 mm.

#### Summary:

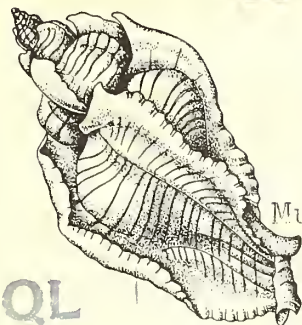
Genera - 111 species - 175



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## SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968

Museum of Natural History - Third Thursday - 7:30 P.M.

President: Clifton Martin  
Vice President: John Michel  
Recording Secretary: Clifford Martin  
Corresponding Secretary: Jeanne Pisor  
Treasurer: Kay Taylor  
Editor: Blanche Brewer

Vol. III

May 1972

No. 5

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\*  
\* THE ANNUAL SHELL AUCTION - MAY, 19th. \*  
\*  
\*\*\*\*\*

THAT DAY IS NEAR --- HERE

Our Annual Shell Auction, May 19th (Friday) at the home of Cliff and Waneta Ames, and DO WE HAVE RICHES FOR YOU!

How about Megasurcula carpentariana and M. stearnsiana, Macrarenne cookeana, (we have TWO), and Haliotis walallensis and H. assimilis, Cancellaria crawfordiana, Fusinus barbarensis, Eunaticina oldroydi, Neptunea taulata, Trophon avalonensis and Trophon corduelis - this last from Australia - to mention a few?

Our generous donors have made it possible for us to acquire some very fine shells.

As usual, you will have time to look the shells over before the auction begins at 7:30 P.M.

But dinner is at 6:00 P.M., so BE THERE - to enjoy, enjoy!

APRIL

From The Minutes

Vice-President John Michel introduced Dr. George Radwin, who was our guest speaker for the evening. His topic was Anatomy of A Book, and was about the many problems encountered by Dr. Radwin and Anthony D'Attilio in the research, writing and publishing of their forth-coming



book on the Murex family. The book is now in the process of being approved by the reviewing board at Stanford University. The book will be illustrated with photographs by David Mulliner and color slides were shown of plates used in its illustration.

Anthony D'Attilio's large collection of Murex was the main source of study material. Also, the outstanding collection of the late Ruth Richmond of Beverly Hills was loaned for study and photographing.

The book will contain a total of twenty-four color plates, illustrating two hundred seventy-four species, with many black and white drawings by Mr. D'Attilio. The book's title will be, "An Illustrated Guide to the Muricidae", and the authors are hopeful that it will be ready for the publishers late this fall.

Dr. Radwin also displayed two specimens of a new Mitra, from off Florida, which was found by Ivan Thompson and which Dr. Radwin and Joe Bibbey will describe. The new species will be named for the late Helen Thompson, who was a member of our Club.

David Mulliner showed some of his recent slides of live nudibranchs and of living molluscs. As usual, Dave's superb photography did full justice to the brilliant colors and delicate textures of these forms of marine life.

Nola Michel showed some very interesting slides of newly laid egg capsules of Neosimnia inflexa that were laid in her aquarium. She also showed slides of the living Neosimnia inflexa.

President Martin announced that the San Diego Shell Club will have a display of live mollusks in aquariums at the annual meeting of the Western Society of Malacologists at Redlands University in June.

Clifford A. Martin

#### NOTE TO ALL MEMBERS

As you see in this issue we are now using pictures. We hope to continue to do so in future editions. We need your articles and if you have pictures to go with it, please include them. The pictures should be in Glossy Black & White. If you are a local member we do have someone who can make a black and white from your color slide. We are all looking forward to YOUR article. Remember - if you can write a letter you can write for "The Festivus". And we don't have to have a picture, but we do need your article!



by Nola Michel

*Simnia aequalis* (Sowerby 1832)  
Form: *S. Quaylei* Lowe 1935

While snorkeling at a good low tide some miles south of San Felipe I found two *Simnia* on red *Gorgonia*. They were about four feet deep. One animal and shell was a beautiful red and the other, animal and shell was white. I placed them in a plastic container of salt water and they survived the rather cool night. As they were still alive the next morning I decided to try to take them home to my salt water aquarium.

Late that afternoon (Feb. 18, 1969) they were placed in the aquarium. It's about 45 gal. and at ambient temperature. Salinity was 1.030, slightly saltier than normal sea water as I had not added distilled water to the tank in some time. 'Resident' occupants were other assorted mollusks and a fish. The *Simnias* appeared to be doing nicely although they had no *Gorgonia* on which to feed.

About seven to ten days later I noticed eggs on a branch of the dead black coral. The black coral was a decorative item in the tank, but closest to their natural habitat. The egg group was about an inch long and encircled the branch. The eggs individually looked like grayish gelatin dots. I was rather excited but I didn't make any special preparation as I thought that the fish would eat the eggs. Shortly after the 1st of April I noticed a color change in some of the eggs. Some were getting an orange-pink and were looking slightly larger than the others. Approximately 25% of the eggs were this way.

April 9th. The fish has gone. I drained the aquaria to a level above the eggs. Slowly I brought the salinity to 1.025 over a period of 24 hours. Then I refilled the tank with fresh sea water from the public outlet at Scripps. Everything then seemed good.

Then I talked our friend Emil Habecker into coming over to take some slides of the animals and the eggs. He came on the 13th and pictures 1 & 2 were taken at that time. The next day I went diving and obtained some *Gorgonia* for the *Simnia* to feed on. I placed it in the tank and within half an hour both were on it and feeding.

When I checked the tank the next morning an egg on the end of the group was split open and was entirely empty. Others were emptying. You could see the tiny veligers with a hand lens. I moved a piece of the *Gorgonia* to a position beneath the egg mass, hoping that some might settle on it. I also removed the charcoal filter at this time, so they wouldn't be filtered out of the water. I did leave the subsand filters on though. Felt they were necessary but did slow them down considerably.

On the 18th I placed brine shrimp in the tank hoping the *Gorgonia* would feed on them. They didn't but left them in to breed, thinking that they might feed on the smaller off spring.

On the 24th my boy reported that one Simnia was on top of the other. Sure enough the white one was on the red. And on the 25th new eggs were laid. They were on the Gorgonia. Each one on a polyp, all around the stalk, two down on one side of the stalk and up to eight on the opposite side. The next day there were more on a different tip of the same Gorgonia. I talked to Emil again and the next evening he came to take more pictures. Pictures 3 - 6 were taken at this time.

On the 30th I had to dispose of 2 pieces of Gorgonia as they were going foul. Not the one with the eggs on it, however. That evening I discovered the Simnia copulating on an egg mass. They had added more eggs to this mass. The White (male) was on top of the Red (female). His penis extended down the right side into the female. She seemed to be twisted up to meet him, her antennae were rolled back toward him. There was hardly any movement, only her antennae. She had a swelling, anterior to the point of entry. They both had their mantles fully extended.

These animals lived in my aquarium for about a year. The veligers never settled out and grew. Perhaps the down current of the subsand filter was too strong or some vital trace elements may have been missing from the water.

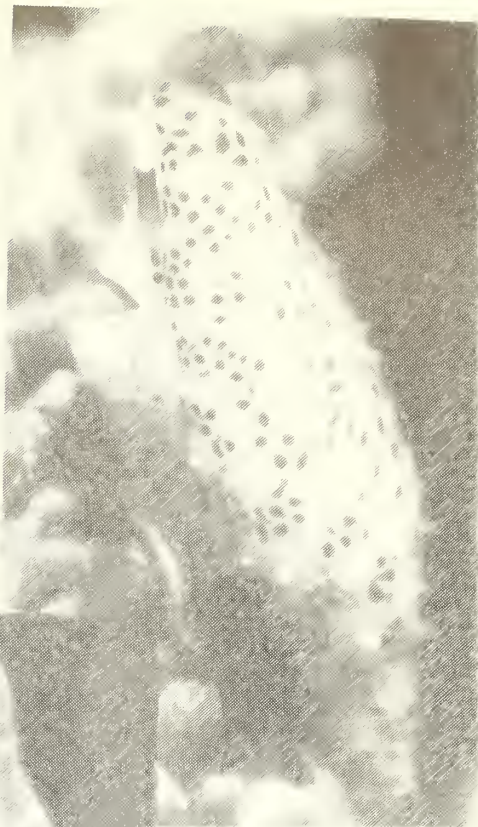
Now, some about the pictures. All but no. 7 were taken by Emil Habecker of the San Diego Underwater Photographic Society. No. 7 was taken by our own Dave Mulliner, after the demise of the animals. Picture No. 1 was shot on a rock. The animals were placed there for photographic purposes. No. 2 is a close up of the eggs laid on the black coral. No. 3 is the same egg mass, the entire thing, showing the opened capsule on the end. No. 4 shows the eggs laid on the Gorgonia - they are the smoother round clear-white objects on the polyps. No. 5 is "Him" on Gorgonia. Note the difference in coloration compared to No. 1. The color spots in No. 5 are the same in number but larger in size. This picture was taken after two weeks of feeding on the red Gorgonia. When I first observed them I could see the radula working in the white animal - he was that translucent. After feeding on the Gorgonia he lost this translucency. No. 6 is "Her" on eggs at the tip of Gorgonia. One of the eggs is visible in the lower left area of the picture. No. 7 was taken by Dave Mulliner to show you what the shell looks like. These are the same specimens.



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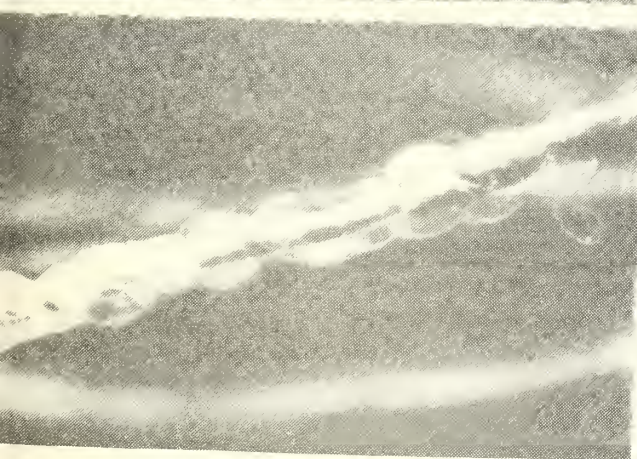
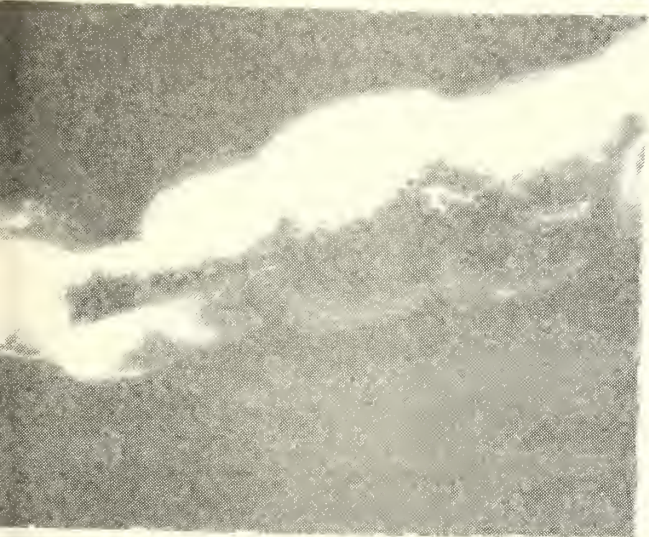


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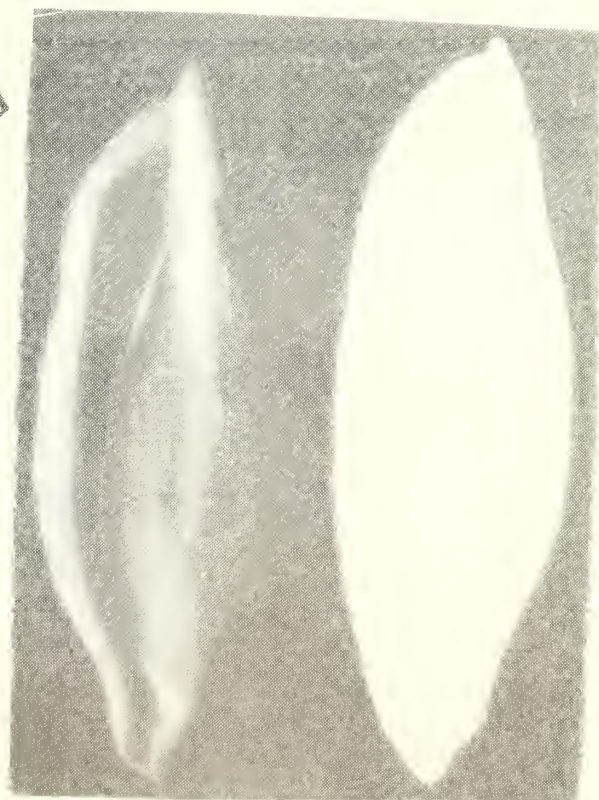


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## Chapter 3

## Sport Fishing Regulations for Saltwater Fish, Mollusks, and Crustaceans

## Article 1. OCEAN WATERS WITH RESTRICTED FISHING

5.1 TIDAL INVERTEBRATES. Invertebrates may not be taken in any tide pool or other area between the high tide mark and 1,000 feet beyond the low tide mark without a written permit from the department except as follows:

- (a) In state parks, state beaches, state recreation areas, state underwater parks, state reserves, national parks, national monuments or national seashores; abalones, chiones, clams, cockles, crabs, lobsters, scallops, and sea urchins may be taken.
- (b) In all other areas, except within marine life refuges or other special closures: abalones, chiones, clams, cockles, crabs, limpets, lobsters, mussels, sand dollars, octopuses, shrimp, scallops, sea urchins, and squid may be taken.

## Article 2, FIN FISH

## Article 3, MOLLUSKS

80. GENERAL Except as provided in this article there are no closed seasons, bag limits or minimum size limits for mollusks, and they may be taken at any time of day or night. In San Francisco Bay and saltwater tributaries east of the Golden Gate Bridge, all species may be taken only between one hour before sunrise and one hour after sunset.

80.1 ABALONES AND CLAMS ASHORE. Abalones and clams being taken must be brought ashore above the high water mark in such a condition that the size can be determined. Such abalones and clams not in the shell may not be transported or possessed, except when being prepared for immediate consumption. Abalones not retained must be replaced immediately, with the shell outward to the surface of the rock from which detached. Clams not retained shall be immediately reburied in the area from which dug.

80.2 FISHING HOURS FOR CLAMS AND ABALONES. One-half hour before sunrise to one-half hour after sunset only.

80.3 MEASURING DEVICES. Every person while taking mollusks which have a size limit shall carry a device which is capable of accurately measuring the size of the mollusks taken. The size of a mollusk is measured in greatest shell diameter.

## Minimum Size Limits, Bag and Possession Limits, and Seasons

82.2 PISMO CLAMS. (a) Season: May be taken in Santa Cruz and Monterey Counties September 1 through April 30. In all other counties except in clam preserves and marine life refuges Pismo clams may be taken at any time of the year. (b) Bag and possession limit: Ten; Minimum size: Five inches in greatest shell diameter north of the boundary between San Luis Obispo and Monterey Counties; 4 1/2 inches in greatest shell diameter south of the boundary between San Luis Obispo and Monterey Counties.

- 82.4 SPECKLED (BAY) SCALLOPS. May not be taken or possessed.
- 82.6 ABALONE. Bag and possession limit: Five in the combination of all species; Minimum size measured in greatest shell diameter: red abalone 7 inches, green abalone 6 1/4 inches, pink abalone 6 inches, white abalone 6 inches, black abalone 5 inches and all other species 4 inches. Open Season: March 16 through January 14.
- 82.8 GAPER CLAMS. Bag and possession limits: Humboldt Bay: 50 in combination with Washington clams; all other areas: Ten (10)
- 83.2 GEODUCK CLAMS. Bag and possession limit: Three (3)
- 83.4 LITTLENECK CLAMS, SOFT-SHELL CLAMS, CHIONES, AND COCKLES. Bag and possession limit: 50 in combination. Minimum size: 1 1/2 inches in greatest shell diameter.
- 83.6 ROCK SCALLOPS. Bag and possession limits: Ten (10)
- 83.8 RAZOR CLAMS. Bag and possession limit: Twenty (20). The first 20 clams dug must be retained as the bag limit regardless of size or broken condition.
84. WASHINGTON CLAMS. Bag and possession limit: Humboldt Bay - 50 in combination with gaper clams. All other areas 20 Washington clams.
- 84.2 MUSSELS. Bag and possession limit: 25 pounds (in the shell) of California sea mussel and bay mussel in combination.
- Gear Restrictions
88. GENERAL. Except as otherwise provided in this article, salt-water mollusks may be taken only on hook and line or with the hands.
- 88.2 DIGGING IMPLEMENTS. Spades, shovels, hoes, rakes, or other appliances operated by hand, except spears or gaff hooks, may be used to take mollusks, provided that no hooking device or any device 36 inches or more in length may be used to take abalone. No instrument capable of being used to dig clams may be possessed between one half hour after sunset and one half before sunrise, on any beach of this state, except tools and implements used in the work of cleaning, repairing or maintaining such beach when possessed by a person authorized by appropriate authority to perform such work.
- 88.4 DIVING FOR MOLLUSKS. In all ocean waters skin and SCUBA divers may take mollusks by the use of hands, or by devices less than 36 inches long, commonly known as abalone irons, except that in all ocean waters north of Yankee Point (Monterey County), self-contained underwater breathing apparatus (SCUBA), or any other artificial underwater breathing device, may be used only to take rock scallops. For the purpose of this section breathing tubes are not underwater artificial breathing devices.
- 88.5 SQUID. Squid may be taken with hand-held dip nets.

THIS IS A REPRINTING OF PORTIONS OF THE STATE FISH AND GAME LAWS. WE STRONGLY SUGGEST THAT YOU OBTAIN A COPY FROM YOUR LOCAL BAIT SHOP OR DIVE SHOP. READ IT THROUGH VERY CAREFULLY, AND BE SURE YOU HAVE YOUR FISHING LICENSE BEFORE TAKING ANYTHING.

Hi,

My Oddities

I have collected while Scuba diving in Hawaii several specimens of Terebra maculata and on close observation noticed that the outer part of the shell has been broken. I found 8 inch and 4 inch specimens with breaks at either end. The outside is very rough, but checking inside the repair is not visible at all. This seems to be Quite common in maculata. I have one large specimen which had the large end broken clear across and the inside repair is perfect. This shell had grown more than an inch since the fracture. If shells could only talk, what a story they could tell.

Enjoy the "Festivus" very much.

Sincerely

Ennest S. Haigh  
(Los Angeles)

Dear Secretary:

I believe that I am still a member, as I receive the FESTIVUS regularly and enjoy it every issue. Here is a suggestion. I was looking over the S.D. Society Transactions Vol. 1 a few days ago and found the article by W.F. Kelsey about collecting - and list of Mollusks of San Diego back in 1907 or 1908. When you are hard up for a program have someone study that list and make comments on it. Just an idea to fill in a short program.

I wish that I could get to some of your meetings but I do not drive a car any more - even then, it is just too far to come down for a meeting.

Regards to the older members who were members when I was there. Especially Dr. Baily.

Sincerely

E.P. Chace  
Lomita, Calif.

ADD THESE NAMES TO YOUR ROSETER!

NEW MEMBERS

BROSIUS, George & Doris  
1350 Loring St.  
San Diego, Calif. 92109  
488-6342

RULON, Mrs. Morgan C.  
Dept. of Malacology  
19th and The Parkway  
Philadelphia, Pa. 19103

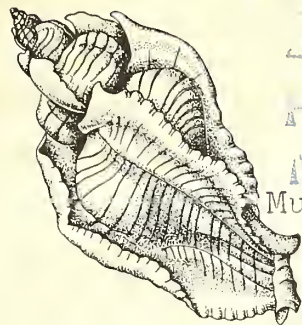
MAULSBY, Mrs. Marjory  
4628 Altadena Ave.  
San Diego, Calif. 92115





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## SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968

Museum of Natural History - Third Thursday - 7:30 P.M.

President: Clifton Martin  
Vice President: John Michel  
Recording Secretary: Clifford Martin  
Corresponding Secretary: Jeanne Pisor  
Treasurer: Kay Taylor  
Editor: Blanche Brewer

ANNUAL DUES: Single membership, \$3.00 - Family, \$4.00 - Corresponding membership, \$2.50 - Overseas mailing, \$3.50. Payable to San Diego Shell Club, 2437 Aster St., San Diego, Calif. 92109.

Vol. III

June 1972

No. 6

\*\*\*\*\*  
\* PROGRAM, June 15: We hope to have Lt. Richard Taylor, speaking on \*  
\* The CURRENT DEEP SUBMERGENCE PROGRAM IN THE NAVY. However- as navy\*  
\* duties do take precedence - if he is at sea, we will have an \*  
\* interesting film \*  
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### THE SHELL AUCTION

Our annual shell auction, held this year in the home of Cliff and Waneta Ames, was an outstanding success. The Ames' big lanai is an ideal place for such an event - plenty of room for the auctioneer's shell-laden table, the buffet of wonderful food, the punch bowl, kept flowing by a master's (Dave Mulliner) touch - and seating room to spare.

Norman Currin and George Radwin shared the wearing role of auctioneer with enthusiasm and dispatch. The shells were world-wide but many were taken on our own West Coast from deep water and the bidding was often spirited.

Financially, it was our most rewarding auction ever, realising \$531.75. This money in our club treasury allows us to purchase many fine (but expensive) books for our library, to make the Festivus a better publication and to contribute to other, more ambitious, shell publications.

But without the generous donations by our members the auction would not be possible. We thank every one of them, most gratefully.

We also thank our hosts, Cliff and Waneta, for their gracious hospitality. We are very much aware of all the arduous preparation that resulted in the organized and comfortable setting in which we enjoyed the auction - and the work involved in the clean-up after it was over. We express our sincere appreciation - - - B.B.

## FURTHER RESEARCH ON CHITONS

By John M. Myers

Whenever I am asked to explain what I did in this project, I am always reminded of the way I responded when I was asked by a fellow exhibitor "Well, just what kind of research did you do with these-er-chitons (pronounced phonetically.) In a brilliant flash of inspired eloquence I said, "Simply, I classified these (pointing to the chitons on my display) by using this (pointing to a radula) instead of this (pointing to some chiton plated.)"

This seems-and- is-an oversimplification but it gives the essence of the project. I began by establishing the well-known problem of identifying chitons. Then, I set up just exactly what I would do in this project, which was continued from the project of last year, and was written in the Question section of my notebook:

### QUESTION

In my prior investigation I wanted to see if I could identify chitons by their radula and, if I found that this was feasible, if my results would correlate with the present system. As you know, I found that I could identify them by the radula, but my results conflicted with the present system.

After reviewing the results of my previous project, I could not help but wonder if there were some items that I had overlooked. Indeed, Dr. Radwin pointed out several areas of investigation which could prove to be of great interest and of great value to my argument.

Bearing this in mind, I have several purposes or questions which I hope to at least partly solve in this project:

1. I would like to go into much greater depth of study.
2. I would like to continue my study until I am sure that I can thoroughly substantiate my findings, whether or not they correlate with the present system.
3. Using my improved methods of research, I will try to find a feature in each specie's radula that is characteristic of the Genus.

### PROCEDURES

To follow my theme of more in-depth research, there are a great many more procedures in this project.

After considering what Dr. Radwin had told me and what I had read since last year, I decided that I could accomplish more and be much more realistic if I concentrated on just one Genus of Chitons for this study. I talked with Dr. Radwin and Mr. George Hanselman, who is a recognized expert on chitons, and they convinced me that the Genus Stenoplax would be ideally suited for my purposes. This is because there are a good number of species in the Genus, and because various features of their exteriors and their radula make them easier to identify and work with.



Next, I had to collect enough specimens to work with. Of course, I had collected many, but I could not find a few of the rarer species of this Genus. I called on Mr. Hanselman and he provided me with an adequate number of specimens of each species.

Finally, after all this, I had five species in all. They were Stenoplax conspicua and Stenoplax heathiana both found locally; Stenoplax conspicua sonorana and Stenoplax mariposa found in the Gulf of California and Stenoplax limaciformis found in the Gulf of California and also in the Caribbean. He also told me of two very rare species, both found locally, Stenoplax corrugata and Stenoplax fallax. He did not have enough specimens of these two rare species for me to work with; I had to make sure that I had a least twenty specimens of each species so that my results would not be confused if I had a poor specimen.

My next step was to remove the radula from each specimen. I discovered that the best way to do this was to first locate the head plate of the shell of the animal. This plate is distinguished from the other seven by way of being smaller and slightly curled upwards. Beneath this plate, in the body of the animal, the head protrudes slightly from the rest of the body, and on this you can see a small slit which, of course, is the mouth of the animal. By separating the entire head from the shell you can detach the radula ribbon.

However, this ribbon is enclosed in a fleshy sheath, which must be removed to see the radula. This sheath is attached quite strongly to the actual ribbon. Therefore, it is necessary to remove the sheath chemically. To do this I used a method that was recommended by Dr. Radwin. I put the ribbon in a test tube filled with a solution of sodium hydroxide (NaOH) and heated it until all of the sheath was removed. The radulae were now ready to observe under the microscope; but before putting them under it, I shredded a few of the radula of each species so that I could get a three-dimensional view of each of the teeth.

I used a 30 power dissection microscope to observe and sketch the radula. I could do this because of the singularly large size of the radular teeth and the features of the ribbon. I probably would have had to use a high-power microscope on Stenoplax mariposa because of its size (about one-half inch) but I could not get the radula out of Stenoplax mariposa. I had been told that there is a question as to whether or not mariposa is really in the Genus Stenoplax, and perhaps the fact that I could not find its radula - that the radula may be imbedded in muscle or located in a different area - may be evidence for the argument. I will discuss this further in the conclusions section.

I made slides of the radula of each species using a 10% solution of KARO syrup as a mounting medium. I will use these in my display.

Sketches at end of paper show my results:

CONCLUSIONS

One of the first things that I must explain is why my results are different from those of last year. (You can readily see this from the enclosed drawings from last year's project.) There are several reasons for this. For one thing, I used a much better dissection microscope, one with better optics. Secondly, I observed more of the ribbon and did not just concentrate on the tricuspid. But by far the main reason is without doubt the fact that I removed all the extraneous material by boiling the radulae in HaOH. When I looked at the radulae last year, there is no doubt that many features were obscured by this extra material.

One totally unexpected conclusion is in the case of Stenoplax mariposa. I could not find the radula of Mariposa in any of the specimens. It is entirely possible that the radula of Mariposa is in a different area of the animal; it could be surrounded by muscle; any number of things could explain it. This ties in well with the fact that there is great controversy over whether Mariposa is really included in the Genus Stenoplax, and this could be evidence for that argument.

One of the purposes of this project was to find a feature in the radula that is characteristic of the Genus. One thing I noticed is that the length of the cusps of the tricuspid increase from left to right. If you will look at the drawings you will see that all the species do this. It would seem the Limaciformis is inconsistent, but does this to some degree. I have checked it more closely and it indeed does to some degree.

It seems that the labial, lateral and central cusp teeth are all of the same design, but further research is needed to be sure this is not true in other Genera.

My original hypothesis that the radula can be used to identify chitons has been confirmed in this project. I have also found a trait that is consistent with the species of the Genus. I am satisfied that I have accomplished many of the goals that I set for this project.

(John M. Myers, with his parents, John and Barbara Myers, is one of the younger members of our club. He won first prize at the San Diego Science Fair in the senior division in Biology, also the Natural History Museum (S.D.) award, for this study. He won Honorable Mention at the Southern California Science Fair at Los Angeles with this same exhibit. We share with his parents in pride in his achievements...Ed.)





side view



isometric view



top view

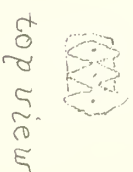
## *Stenoplaea limaeformis*



side view



isometric view



top view

## *Stenoplaea conspicua*

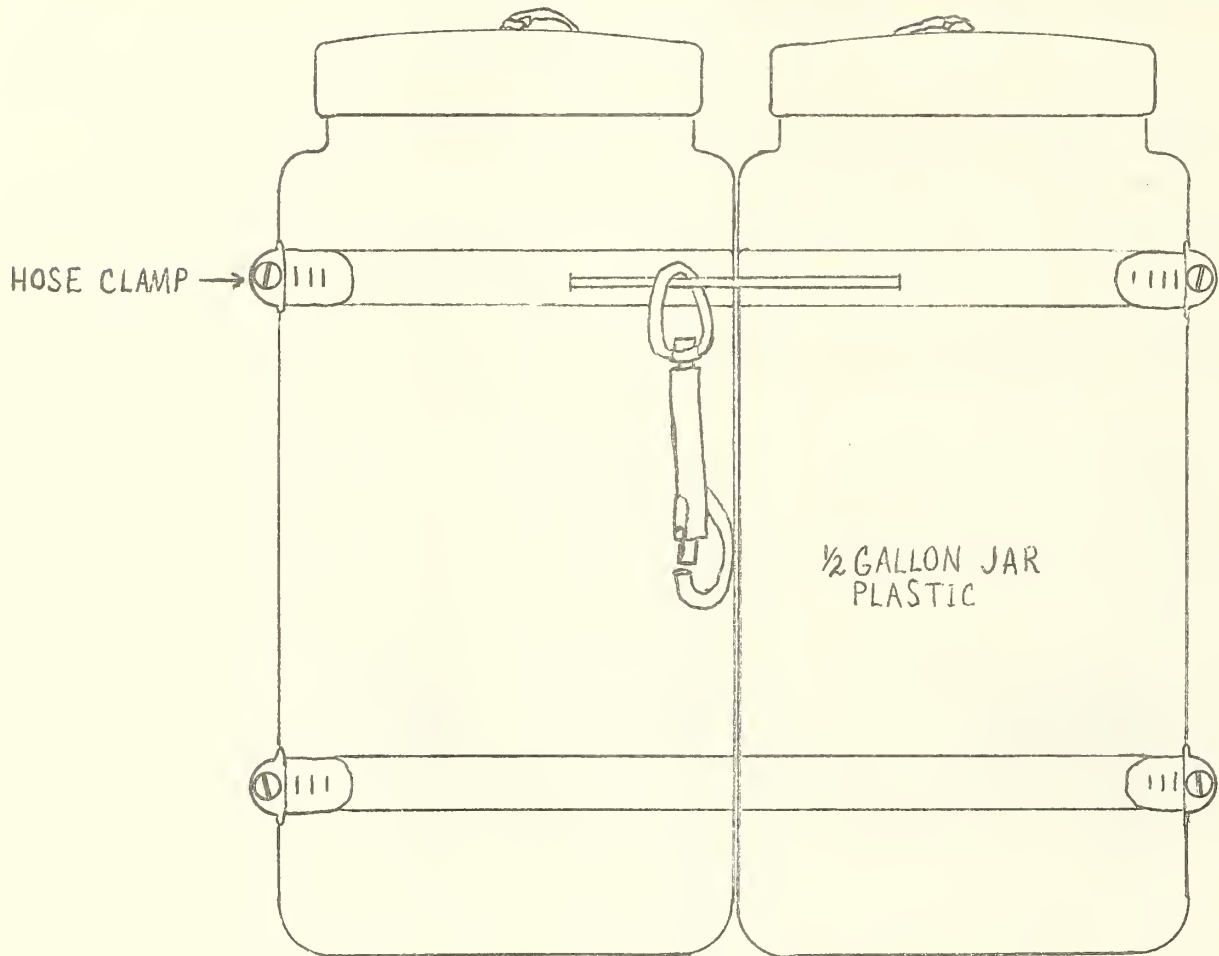
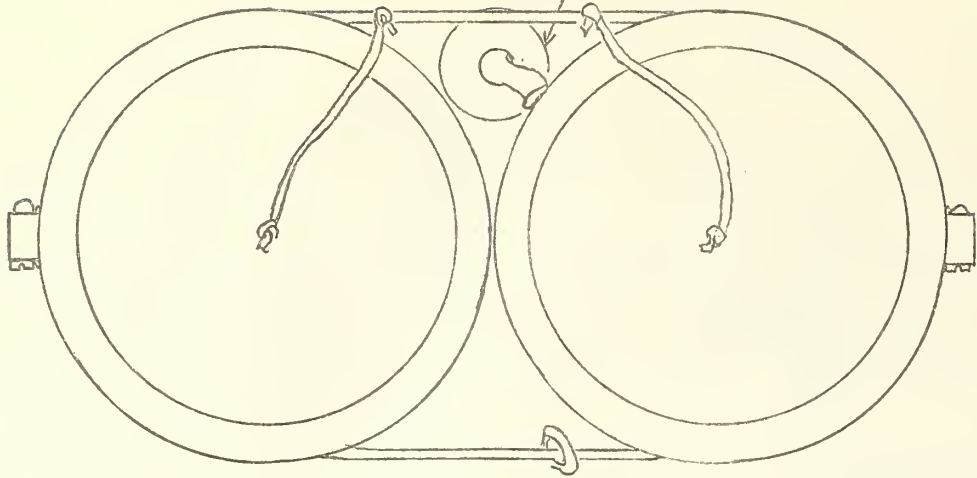


## *Stenoplaea heathiana*



## *Stenoplaea conspicua sonnana*

BABY BOTTLE PLASTIC BAGS



Members of the Ameripagos Expedition carried with them these handy collecting bottles. Dave Mulliner was kind enough to provide us with the drawing and instructions for making. Bob Given of the USC Marine station on Catalina Is., furnished them with the design and showed them how to use them.

The two half-gallon wide-mouth plastic bottles are fastened together with stainless steel hose clamps. A snap swivel fastens to your belt for diving or wading. Plastic bag baby bottles are attached by a rubber tube held by the hose clamps. A four ounce weight is imbedded in plastic resin on the bottom of each bottle for those who plan on using them for diving. Use the plastic bags for shells you want to protect - they protect cone lips very well. We use one of the bottles for grunge and the other for shells.

You can obtain hose clamps and brass hooks at any ship chandlers, and the large - mouth plastic bottles at Van Waters & Rogers, a Chemical Equipment Supply House.

#### LIBRARY NEWS

By Carole M. Hertz

A new addition to our Shell Club library is Tom Rice's, A CATALOG OF DEALERS' PRICES FOR MARINE SHELLS, Third Edition, published in May 1972 and selling for \$3.00. Nearly 2,000 additional species are now included over those in the 1969 edition. The book is a compilation of shell prices currently obtained from shell dealers. It is a valuable tool for those who buy and sell shells as well as those who trade for value.

Unlike Van Nostrand's Standard Catalog of Shells, it covers all families of marine shells. Since it is a compilation of dealers' prices, it is also a more realistic source of price information than the Van Nostrand catalog. It is hoped that all of those who sell shells make copies of their lists available to Tom Rice so that future editions of this catalog become more complete and more valuable.

Donated to the library by Tom Rice is a copy of the revised edition of his MARINE SHELLS OF THE PACIFIC NORTHWEST. (First edition reviewed in Sept. 1971, Festivus). The book has only minor changes from the first edition. There are changes of the species names in the Macomas and the Tellinas and some changes to make species and genus names agree.

Also received from the Smithsonian, a new publication, PROCEEDINGS OF THE FIRST INTERNATIONAL CONFERENCE ON MEIOFAUNA, edited by Neil C. Hulings, Smithsonian Institution Press, 1971. (Meiofauna is a word... coined by Mare in 1942 to describe metazoans (and foraminifera) too small to be retained in the 1mm sieves used by marine biologists.")

As many of you know, the meeting of the Western Society of Malacologists will be the 18th through 21st of this month. Our club is planning a display featuring our Festivus. We will have marine aquariums with live animals. A board surrounding them will display reprints of your aquarium observations, plus 8 by 10 color photos of many of the same animals described in the articles. We are also planning a sample Festivus to give away. It will include all of the Aquarium Observations since we started publishing The Festivus. We hope to see many of you there!

#### AN AID IN PREPARING MOLLUSKS FOR THE COLLECTION

By Carole M. Hertz

From Susan and Martin Bishop, our members now returned to Cambridge, England, we learned a most helpful hint for preparing shells for the collection. For those small, difficult-to-clean shells, try putting the mollusks in a pot with salt water. Slowly bring the water to a boil. The animals will die with the opercula visible. We have successfully used this method with Carithidea, Odostomia, and Typhis among others. (Epitonium turn red, however). Later the animals can be placed in alcohol for preserving without fear of the animals' retracting.

#### THE MYSTIC BOND

By Edwin C. Roworth

THERE IS a mystic something,  
Its story I must tell,  
For everywhere one travels  
It casts its subtle spell.  
'Tis found on every ocean beach  
Among the rocks and sand,  
Where people seek the elusive shell  
With pail or sack in hand.

We meet on distant seashores,  
Quite absent is all guile,  
We cannot speak the language  
But understand the smile.  
For whether king or native  
Here all distinctions end,  
If you belong to the shelling clan  
He'll greet you like a friend.

To share the joy of beauty  
Of a snail shell's symmetry,  
Or just the peaceful freedom  
Of the shores of a friendly sea.  
Whate'er the fascination  
Shells may have for you and me,  
This we know - they unite us all  
With a bond of true Harmony.

From The Hawaiian Shell News



## COLLECTING IN THE SAN FELIPE AREA

By Jules Hertz

The recent low tides at San Felipe (May 13 and 14) found the Hertzes, Mulliners, Schecks and Joyce Gemmell out for early morning collecting. On May 13, the collecting site was Campo Uno (Rudy's). A number of Typhis coronatus Broderip, 1833 were collected. On the 14th, the group traveled to Alicia Playa which is approximately 20 miles south of San Felipe. A number of fine shells were collected such as Trivia Californica, Peteropurpura erinaceoides, Erato columbella, Lucapinella milleri and several Oliva incrassata (golden form). The most unusual find was a Typhis coronatus discovered by Suzanne Hertz. This is the first reported specimen from Alicia Playa, as far as we know. It was completely exposed on mud among rocks, and approximately 100 ft. from the water line at low tide (approximately - 5.5 ft.).

## MORE NAMES FOR YOUR ROSTER

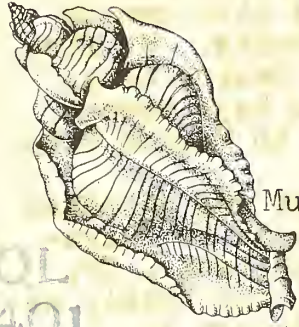
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THE

# FESTIVUS



## SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968

Museum of Natural History - Third Thursday - 7:30 P.M.

President: Clifton Martin  
Vice President: John Michel  
Recording Secretary: Clifford Martin  
Corresponding Secretary: Jeanne Pisor  
Treasurer: Kay Taylor  
Editor: Blanche Brewer

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Vol. III

July 1972

No. 7

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### \* PROGRAM FOR July 20:

\* Anthony D'Attilio - Remarks on Coralliophilidae

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### FROM THE JUNE MINUTES

Meeting called to order by President Martin. Vice-president John Michel introduced Lieutenant Richard Taylor, our guest speaker for the evening, who told of the Navy's Submarine Development Group I. He also showed slides of the development of the Trieste deep-water submergence vessels and many unusual underwater scenes that were taken from them.

Trieste I was built in 1963 and since that time two others have been built with added improvements. The Trieste will accomodate three people when it submerges.

Among the many slides shown were some of mollusks, fish, starfish, sea cucumbers etc., mostly taken in depths ranging from three thousand feet to five thousand feet.

The Trieste has made a dive to a depth of 35,000 feet and is equipped to do rescue work.

Nola Michel showed a large, beautifully arranged, fold-out display of color photographs and selected reprints from the Festivus which will be a part of our Club's display at the Western Society of Malacologists meeting at Redlands University this year. Our Club will also display two aquariums of living mollusks.

Dave Mulliner showed slides taken at the Club's auction which was held at the home of Cliff and Waneta Ames. He also showed slides of a live Ficus ventricosus and some beautiful shelling scenes he had taken at San Felipe.

Clifford A. Martin  
By Recording secretary

ANNUAL DUES: Single membership, \$3.00 - Family, \$4.00 - Corresponding membership, \$2.50 - Overseas mailing, \$3.50. Payable to San Diego Shell Club, 2437 Aster St., San Diego, Calif. 92109.



By David Mulliner

Feb. 21, 1971 --- The Expedition members were Carolyn Stover, Jackie Grundman, Bill Old, Ellen Brennan, Twila Bratcher, Gale Sphon and myself. Carolyn and I arrived at the L.A. airport, loaded with camera gear, carrying very heavy bags, and wearing our weight belts. We flew south on a APSA (Peruvian airlines) Convair 990 towards Mexico City. The flight was down the Baja coast to San Quitin, across Baja toward San Felipe and down the Gulf to Topolabanco then inland to Mexico City.

At Mexico City all of our diving and collecting equipment was unloaded and left behind to make room for other luggage. The flight to Guayaquil, Ecuador took four hours. On the plane we met a publisher, Sr. Munoz, he will call us tomorrow. After settling down in the hotel, we met in the bar for a beer and a sandwich. It is now midnight in Ecuador, but I am still on San Diego time ( 9:00 p.m.).

Feb. 22, 1971 --- Had our airconditioner going for a while last night but turned it off as it wasn't that hot, only 80° F. and humid. At the airport, we were told our equipment was still in Mexico City, maybe mañana. Sr. Munoz's niece lives near the airport, she will keep our extra suitcases while we go to Peru. She brought out a local newspaper with an article in it about our expedition.

The airport manager sent the bus to pick up the workers early so that we could be given a guided tour of Guayaquil. There was a heavy rain storm last night that broke loose the Water Hyacinths up river. The whole river was covered with floating islands of Hyacinths heading seaward. Carnival is in progress, ( just before LENT ) which is really something to see. All the kids, even teens and some adults are throwing water balloons and many have covered their heads with ashes. After dinner we went for a walk around the beautiful Park near our hotel. An Ecuadorian gentleman pointed out a Three-toed Sloth in a tree, took pictures, told Jackie and Gale who got excited and had to go see the Sloth. A man called Gale and made arrangements to meet us after reading about the expedition. He was an Ecuadorian in his sixties who has traveled over most of the world and has now become interested in shells. He gave Gale a *Conus fergusonii* and showed us many of his *Olivella* and *Cypraea*.

Feb. 23, 1971 --- At the airport we saw them finally unloading our equipment but wouldn't let us touch it as everything has to be trucked to the Custom House downtown. Left for Lima, Peru and flew over cloud-covered land until we landed. In Lima we rented rooms in a large private house two blocks from the beach. We collected on the beach for a couple of hours, getting chitons, littorines and limpets from a rock jetty and wet from the pounding surf; the water being muddy and rough. The man at the tourist bureau said they have sunshine in January, February, and March but none the rest of the year as it is foggy. No rain at all in this part of Peru.

Shopping in a native market was exciting and among us, we bought a Llama rug, bronze llamas, Alpaca blankets, and a copper and glaze cathedral. We had dinner at a restaurant called "Haiti", with a new friend from Scotland who is working as a civilian for the Peruvian Navy. The meal was good and a variety of Peruvian dishes. Afterwards we window-shopped, remarking that it had been a memorable day, and didn't seem possible that we were this far (Peru) away from home.

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#### AQUARIUM OBSERVATIONS

(*Cypraea spadicea* Swainson 1823)

Nola Michel

The other evening, as is my habit, I checked the aquarium before retiring. I was not suprised to find *Hexaplex erythrostoma* feeding on the *Astraea gibb* rock. I had placed the *Astraea* in there for the purpose of providing the larger *Murex* in the tank with food. The *H. erythrostoma* wasn't very hungry as he had fed the previous day. So he may have left his dinner unfinished. At any rate, when I checked the tank the next morning the *Cypraea spadicea* was lying under the aperture of the dead *Astraea*. The mantle was fully extended. He stayed there for hours. Seeing that he was not seeming in a hurry to move, I called Dave Mulliner, (our trusty house-calling Festivus photographer) and asked him to lunch. He came with appetite and camera. We had to turn over the *Astraea* to shoot the picture, and the *Cypraea* retracted his mantle, but continued to feed. Later, after we ate lunch we noticed the *Cypraea* left his meal. Upon removing the *Astraea* so the tank wouldn't foul, I noticed that the 'softer' parts of the animal had been consumed leaving the tough foot meat still attached to the operc.

#### ATTENTION ALL MEMBERS

We NEED articles for our paper. This is YOUR paper, a vehicle in which to share your shelling experiences - whether or not you have seen something in your aquarium or in the field.. We want to know about your latest trip, or if you have found a new way to clean something -- or even if you've goofed in some way. Maybe it would save one of us from the same goof! How did you become interested in shells? Only you know, unless you share your stary with us. For those of you who are long-distance, corresponding members it may be the only way we can know you. If you can write a letter to a friend you can write for the Festivus. Please share your experiences with us. Now and often! Your article does not have to be typed, only legible. We have a good publishing committee. Someone will type it for the printer and our competent editor will fo over it fro grammer and spelling, so if you're like me and spell terrible, you have no worry. We can now also print pictures. Please send black and whiteglossy pictures with your article of possible. We can take a B&W photo from a color transparency if you send a copy. No pictures can be returned.





#### AQUARIUM OBSERVATIONS

(*Crepidula onyx* Sowerby 1824)

Nola Michel

One day I looked into my aquarium and saw small specks of veligers flitting around. I assumed that they were *Hexaplex erythrostoma*, for she had an egg mass in one of the upper corners of the tank. In a day or so the 'specks' settled onto the side of the tank and were barely visible, only about 1 mm long. At four days they had grown to a length of about 4 mm and were quite different. It was quite apparent that this was not a *Murex*! It had the look of a tiny *Crepidula*.

In the first photo shown the animal has four tiny whorls to its shell and you can see the black eyes. In the next picture you can readily see the first whorl only, at the apex of the shell. It had rapidly developed into the familiar *Crepidula* form. There were *Crepidula* of several sizes on several shells in the aquarium.

The pictures were taken by David Mulliner. I collected several specimens from the sides of my aquarium for him to take their 'portraits'.

Since then I have had *Crepidula* settle out in my tank a couple of other times. Never have I seen an egg mass. I believe they spawn into open water, or perhaps the females brood eggs out of sight until they hatch into the veliger state.

By Nola Michel

This was the first WSM meeting that I've been able to attend and I thoroughly enjoyed every minute. We arrived at noon and quickly set up our Festivus aquarium display. We just made the opening greetings and the first symposium at 1 pm, by missing lunch. The afternoon was taken by an Ecology Symposium chaired by Dr. James Nybakken. That evening we made up for having missed lunch. There was a bounteous barbeque held at the home of the Shasky's. After that we were entertained in the dorm lounge by Bert Draper, showing slides of some of his beautiful small shells.

At this point I should like to say that the conference was held at Redlands University, Redland, Calif. We used Bekin-Holt Dormitory Hall and Lounge. This is one of the most beautiful campuses I have seen. And the weather co-operated too - not too hot and even a little rain one evening.

Monday morning started off early with an Opisthobranch Symposium chaired by Michaeline Farmer (substituting for her husband, Wesley). I personally found this to be one of the more interesting sessions. After this session we assembled for our group photo. The cameraman was funny, but he shot an excellent photo and I guess that's what counts!

After lunch we again assembled at Whatchorn Hall for the afternoon session. We heard Barry Roth on Marginellid radula and Anthony D'Attilio on Coralliophilidae. Then there was a Pelecypoda Symposium, chaired by Dr. Vida Kenk. After dinner on campus we assembled in Holt Lounge to hear Robert Talmadge speak on the strange things drag boats bring up, and Lindsay Winkler on the bromine content of Aplysia. Directly after, the Annual Auction was held.

Bright and early Tuesday morning Dr. Rawin chaired a symposium on Spawning Habits and Spawning Products. This, in my estimation, was one of the best sessions with our own Dr. Radwin, Joyce Gemmell and David Mulliner taking part.

Tuesday afternoon we saw a selection of slides by William Pitt and heard Kate St. Jean speak on Xenophora. Then we were dismissed to attend the workshop of our choice. There were six different choices, all of which I wanted to attend - Chitons, Photography, Shell Art, Minute Shells, Pelecypoda and Opisthobranch. Eeny-meeny-miny-moe----I chose the clam group and really felt I learned a lot.

That evening we traveled through a light mist to Griswold's Restaurant and enjoyed the best banquet I'd ever attended - a real taste treat - and the speaker was as good as the food. Dr. Bruce Halstead spoke on Global Pollution and Your Health. Dr. William ('Bill') Emerson was honored with an award for his outstanding contribution to the study of Malacology.

Wednesday started off with miscellaneous papers and then a Symposium on Conservation, chaired by Hans Bertch. Directly after, the business meeting was held. The 1973 Meeting will be held July 11 - 14 at Asilomar, Calif.



The host club was Ycipapa Shell club and I must say that they did a beautiful job. Took care of problems small and large. The favors they supplied for the banquet were exquisite bouquets of tiny shell 'flowers' arranged in pink Murex 'vases'. The only unhappy note was that Miss Winifred Wagg suffered a heart attack Monday morning and was hospitalized for the remainder of the conference. I hope by now she is well and back on her feet.

There was a session on Wednesday afternoon too. It started off with slides of Panama by Carol Skogland. ( I WANNA GO! ). They were followed by two talks on land snails and a talk by the President, Beatrice Burch, on Research in Hawaii. We had to leave before the last three talks, as we had the display to take down and time was pressing us to be home.

## THE PERIOSTRACUM OF MOLLUSKS

By Anthony D'Attilio

Called at times the epidermis, the outer layer of the molluscan shell affords much interest to those students who want to know a little more about shells. The periostracum is a chitinous membrane covering most shells. This chitinous matter secreted by the mollusks is found not only in the periostracum but forms also the horny material of the non-calcareous operculums. It also forms the conchiolin, which is the matrix first deposited by the mantle of the animal and on which the shelly matter is then built up. In some of the Opisthobranchiata, for instance, little or no shell matter is ever deposited over the conchiolin. The periostracum no doubt serves as a protective skin to the mollusk while the animal is alive and in its natural domain. When dead, however, the periostracum dries and contracts and in time splits and flakes off from the shell. In the case of fresh water shells the periostracum is generally heavier and more resistant to drying out, although the condition under which it is kept in a collection probably accounts for the time it would remain intact upon the shell.

In a consideration of land shells it is apparent that the periostracum is thickened to a degree where it becomes for all purposes a permanent layer. It has been called a cuticle with reference to the Helicostylas, but, regardless of it's thickness or permanency, it usually contains all of the coloring and design rather than the shell below. Not all land shells have this layer, of course. In one instance, the New Zealand Paryohantas, this chitinous layer is of great strength and thickness. Unfortunately, it does dry and contract and, overcoming the shelly matter, it eventually tears the entire shell apart, the shell often literally exploding under the tension.

The periostracum is never found on some genera - such as Cypraea, Oliva or Ancilla - as the animal's mantle envelopes the shell for the greater period of its growth. This is especially the case with the cowries.

The periostracum is often, in marine as well as land shells, an important element in the appeal of the shell to a collector. In the case of many bivalves most of the lustre and color, and at times the design, is located solely in this outer skin rather than in the shell. It is true that in other shells the periostracum is dull and conceals their beauty. Besides being colorful and shiny, or often dull and opaque, the perio-



stracum can be hairy or spiny. The hairs can be evenly distributed or they may form symmetrically arranged tufts following the sculptured form of the shell below. On the other hand, as in the genus *Trichotropis*, the spiny processes of the periostracum find no counterpart in the shells underneath which are quite smooth.

Now a word with regard to keeping a shell collection where the purpose is to give it some scientific value. If the collection is large enough and the space warrants it, I would certainly urge all collectors to keep at least a portion of each lot showing the shell in its natural condition, in the same sense that one keeps the operculum and any other data. As for many of the bivalves, the removal of the periostracum would only result in leaving one with a dull white shell, and so at least in some instances the shell's appearance is definitely enhanced and the species only recognized as such by the periostracum.

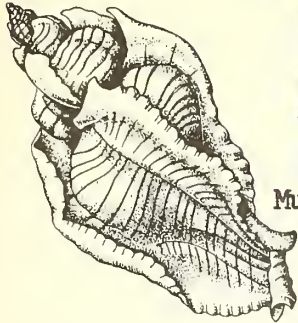
---From the N. Y. Shell Club Notes 1960



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## SAN DIEGO SHELL CLUB

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Museum of Natural History - Third Thursday - 7:30 P.M.

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August 1972

No. 8

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\* PROGRAM For August 17:  
\* David Mulliner - Breeding Habits and Life Cycles of Three Species of  
\* Nudibranchs from the Eastern Pacific  
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### FROM THE JULY MINUTES

Meeting called to order by President Clifton Martin. Vice President John Michel introduced the speaker for the evening, Anthony D'Attilio. Mr. D'Attilio read a paper that he had originally prepared for the meeting of the Western Society of Malacologists, at the University of Redlands in June. His Paper was about the many problems involved in classifying and describing the family Coralliophilidae. He discussed the different shell characters in the Coralliophila and Latiaxis shells. Since mollusks of this family have no radula and shell characters tend to be similar, the problem of classification is often very difficult to resolve.

Mr. D'Attilio showed slides of the shells discussed and had slides of the protoconchs, as seen through a microscope and had drawings made by use of a microscope and a camera lucida attachment. His objective was to determine if the protoconch of these shells could be used as a method of identifying the species. In studying the protoconchs it was learned that most of the Coralliophilidae seem to have a long larval life which permits a wide distribution of the genera during the veliger stage. Since the protoconchs of many species are similar it was concluded that the protoconch is of no value in classifying the species of this family.

David Mulliner showed slides taken at the W. S. M. meeting at the University of Redlands in June. These included slides of the San Diego Shell Club's exhibit at the W. S. M. Meeting. He announced that there were sixteen people from the San Diego area who attended the meeting. Dave also showed slides of local underwater scenes.

It was announced that two of our members, Art and Emma Rose West, are moving to Oakhurst, Cal, and will not be able to attend our meetings. We wish them every enjoyment in their new home.

Clifford A Martin, Rec. Sec.



REMARKS ON CORALLIOPHILIDAE (GASTROPODA, MURICACEA)

By Anthony D'Attilio

The Coralliophilidae also known as Rapidae or Magilidae has some well defined genera which have found acceptance in general systematic works. These genera include a minority of the species referable to the family. A majority of Coralliophilid species have presented difficulties in generic placement, principally due to intergradation of conchological characters and few clear-cut areas of demarcation. This is so in spite of the fact that extreme forms may readily be separable. A major factor contributing to the poor understanding of the systematics of this family is the lack of a radula in its members. Radular morphology in the *Stenoglossa* is very characteristic for the supraspecific taxa, a fact lending substantial support to the presently acceptable systems of classification.

Some shallow water species, especially those feeding on reef corals, have been observed to feed suctorially. These observations suggest that most species live parasitically on such sessile animals as soft and stony corals, sea anemones and colonial ascidians. A few species in the genera *Magilus*, *Rapa*, *Magilopsis*, *Leptoconchus* and *Quoyula* are especially distinctive because they attach themselves permanently to their hosts on some external area or become embedded in the tissues of soft or stony coralline colonies.

The majority of coralliophilids however remain mobile, retaining a well developed operculum. The species making up this mobile majority display considerable variation in shell morphology within the confines of the family characters, as defined by Thiele in "Handbuch der Systematischen Weichtierkunde," and Wenz in "Handbuch der Paläozoologie." This shell variability, in my opinion, has resulted in an overabundance of generic and subgeneric names including: *Latiaxis* Swainson 1840, *Pseudomurex* Monterosato 1872, *Tolema* Iredale 1920, *Babelomurex* Coen 1922, and *Coralliophila* H. and A. Adams 1853. There are approximately 25 nominal genera presently in the literature, a number seemingly greater than necessary, bearing in mind the known degree of species variability. This variability is partly responsible for the situation in which numerous species have shell morphology which is intermediate between two genera. The species could with equal justice be assigned to one genus or another.

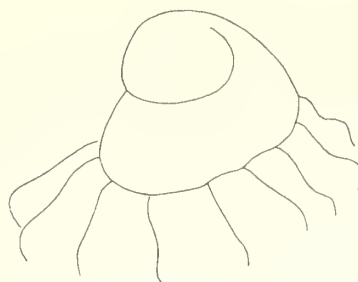
In view of the lack of radular information to aid in the clarification of supraspecific divisions, I undertook to determine whether the protoconch is of systematic value at the generic or subgeneric level.

My results indicate that several distinct types of protoconch occur in this family, but these are not always associated with specific types of shell form. As might be expected, these types of protoconchs are not entirely clearcut because intermediate forms occur. Nevertheless the extremes may be defined as follows:



L. BABELIS Requier

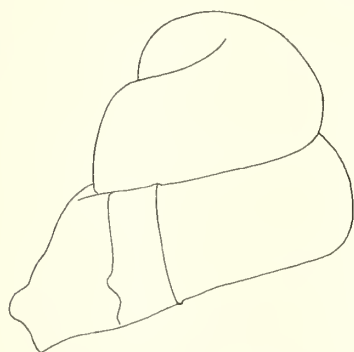
Fig. 1



L. DEBURGHIAE Reeve

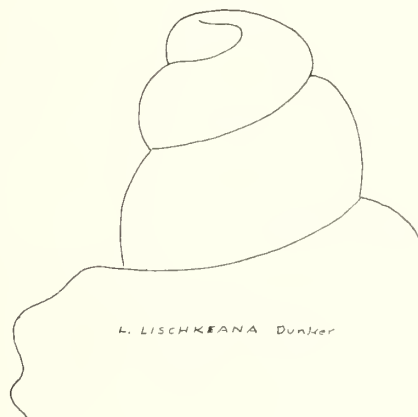
Fig. 2

a simple bulbous protoconch of one and one-half polished whorls; Latiaxis babelis (Fig. 1) and Latiaxis deburghiae (Fig. 2).



L. EUGENIAE Bernardi

Fig. 3



L. LISCHKEANA Dunker

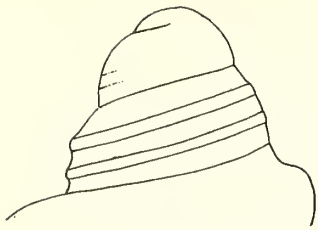
Fig. 4

a moderately expanding protoconch of two to three and one-half smooth, convex whorls; L. eugeniae (Fig. 3) and L. lischkeana (Fig. 4).

similar to L. eugeniae and L. lischkeana but differing in having faint indications of axial lamellae on the final whorl; C. species (Fig. 5) from Fernando Poo, West Africa.

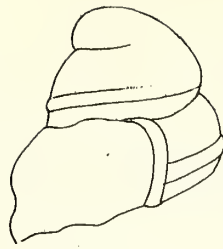
C. SPECIES ? FERNANDO POO  
W. AFRICA

Fig. 5



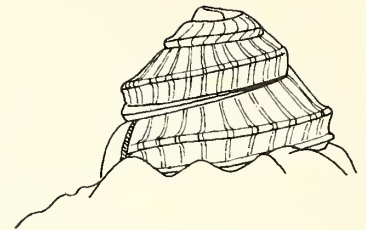
L. WINCKWORTHI Fulton

Fig. 6



L. ARMATUS Sowerby 3rd

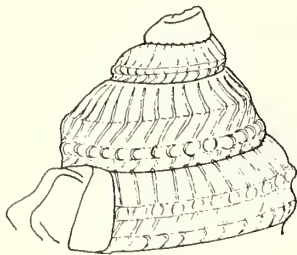
Fig. 7



C. PARVA EA Smith

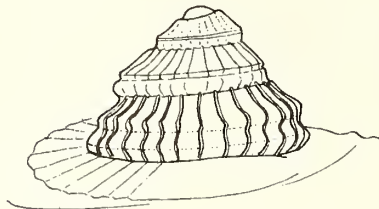
Fig. 8

a moderately expanding two to three and one-half whorl protoconch with a single or double transverse ridge; L. winckworthi (Fig. 6) and L. armatus (Fig. 7).



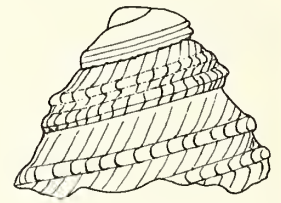
C. COSTATA Blainville

Fig. 9



RAPA PAPHYRACEA Lamarck

Fig. 10



C. MEYENDORFFI calcar

Fig. 11

a moderately expanding protoconch of three and one-half whorls, strongly cerinate, and with axial lamellae. The protoconch is further modified by possessing whorls that are flatsided as well as convex; C. parva (Fig. 8), C. costata (Fig. 9), Rapa papyracea (Fig. 10), and C. meyerendorffi (Fig. 11).



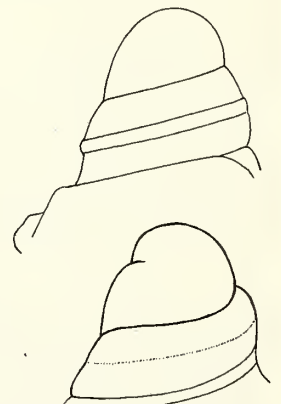
C. CREBRILAMELLOSA Sow.

Fig. 12



C. EROSA Röding

Fig. 13



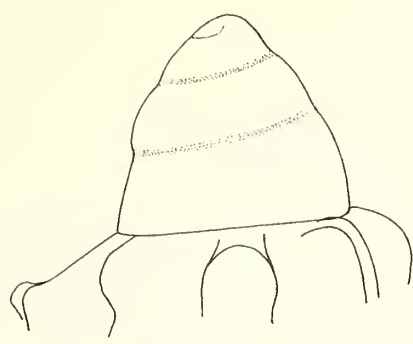
L. ECHINUS Azuma

Fig. 14

the protoconchs of Figs. 12-16 , a few Indo-Pacific species, serve to show

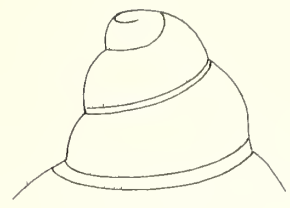


the diversity of protoconchs for each.



SPECIES? ZANZIBAR

Fig. 15



C. PYRIFORMIS KIRA

Fig. 16.

One unexpected result of this study is that, based on protoconch morphology the coralliophilids of the New World, with perhaps some exceptions, are a homogeneous group.

The high number of whorls in the protoconch is, in general, indicative of a planktonic, veliger larva of some duration. The presence of such larvae implies a potential for dispersal and the capability of establishment of the species over a wide range. I believe this dispersal would be limited only by ocean currents to transport the larvae, and suitable hosts on which the settling larvae could successfully metamorphose. Indirect evidence of such long-duration pelagic larvae, and of long distance transport, is provided in the existence of very similar, if not conspecific forms, ranging in one instance from the eastern Pacific across the Caribbean to the Mediterranean Sea. In another instance a species, showing barely, if at all, distinguishable characters over its range, is found in South Africa, Australia and Japan.

Primarily, in conclusion, my impression is that the protoconch is of no significant help in clarifying overall coralliophilid systematics. However, in the New World forms, study of the protoconch may be of help in revealing zoogeographical affinities. But it is also clear that similarities in shell form do not necessarily go hand in hand with that of protoconch morphology.

Ed. note: This extract is based on a talk given by Mr. D'Attilio at our July meeting after having been presented by him at the W.S.M. meeting. The protoconch drawings were done by Mr. D'Attilio and were accompanied, during his talk, by photographs of the shells discussed.

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BAUER, Mrs. Hugo C. (Laura)  
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WEILER, Elaine J.  
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Escondido, Calif. 92025

PERRY, Pollyann  
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Escondido, Calif. 92025

CHANGE OF ADDRESS

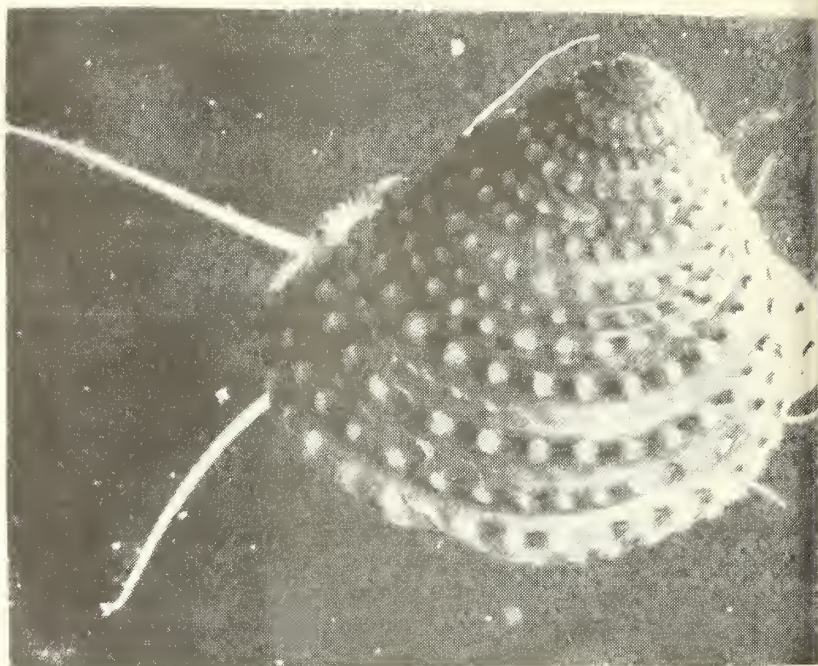
WEST, Emma Rose and Art  
P.O. Box 730  
Oakhurst, Calif. 93644

STOVER, Carolyn  
4505 Leon St.  
San Diego, Calif. 92107

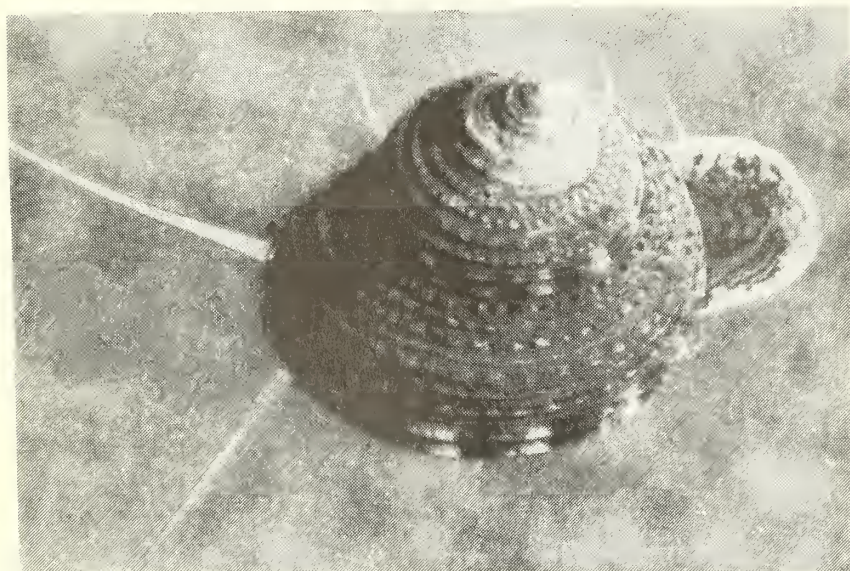
## THE CALLIOSTOMA DIVES

Nola Michel

On June 10th this year we were out off Pt. Loma in about 60 ft. of water. The bottom was covered with fist size rocks and there was a large rock about four foot tall, jutting up. Dave was looking over one side of it, while I scoured the other. On my side was a formation of pink coralline algae. And on the alga sat a beautiful purple and orange *Calliostoma annulatum*. → The edge of the alga had been damaged. and I assume this was from the animal's feeding on it.

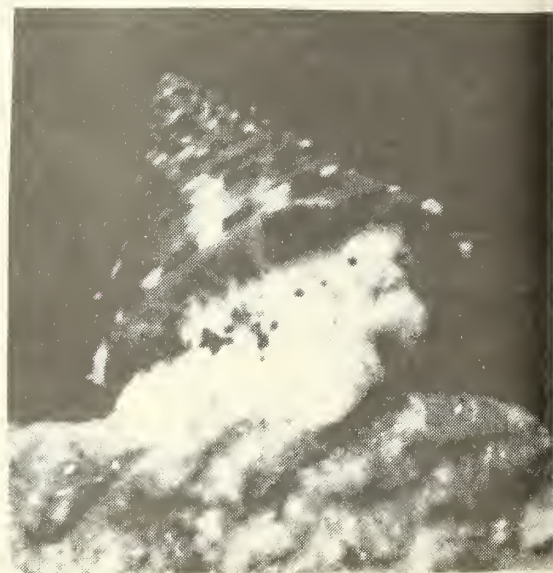


x 3



x 3

Also on that same dive John Myers took a *Calliostoma tricolor*. →



x 3

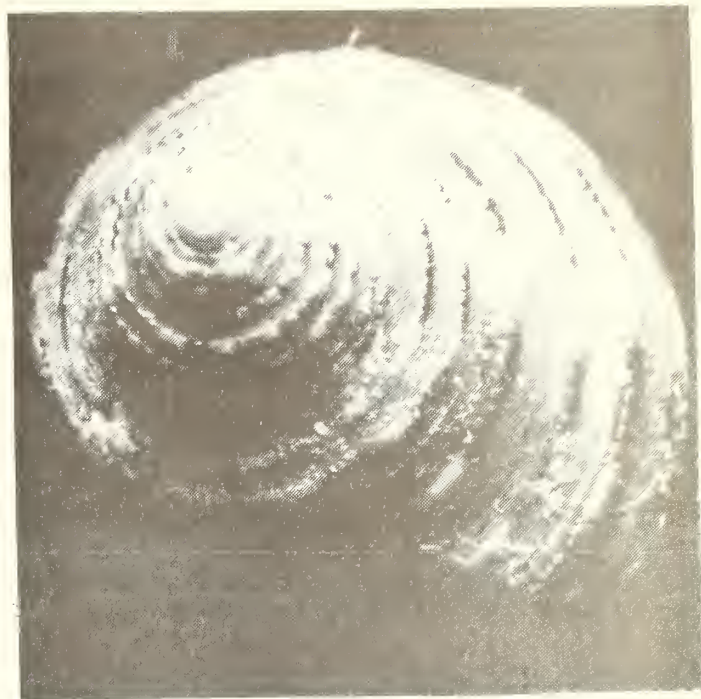


We were also out off the Point on the 1st of July. On this dive Dave found *C. tricolor* and *C. gloriosum*. I found another *C. annulatum*. This time I also took some of the coralline algae I found it on, so Dave could take some pictures of it feeding.

Dave still had both of my other calliostoma at his place for picture taking purposes. I might also say that those two attended the WSM meeting at Redlands University. They were a part of our Festivus display.

All but one of the pictures were taken by David Mulliner. John Myers took the picture of this *C. tricolor*. When Dave was taking the second set of pictures he placed the first *C. annulatum* on the coralline algae. It had eaten nothing in three weeks and had faded slightly in vibrance of color. It went right to dinner and started gobbling coralline algae.

On a dive two weeks ago in the same area Carolyn Stover found two large and two small *C. gloriosum*.



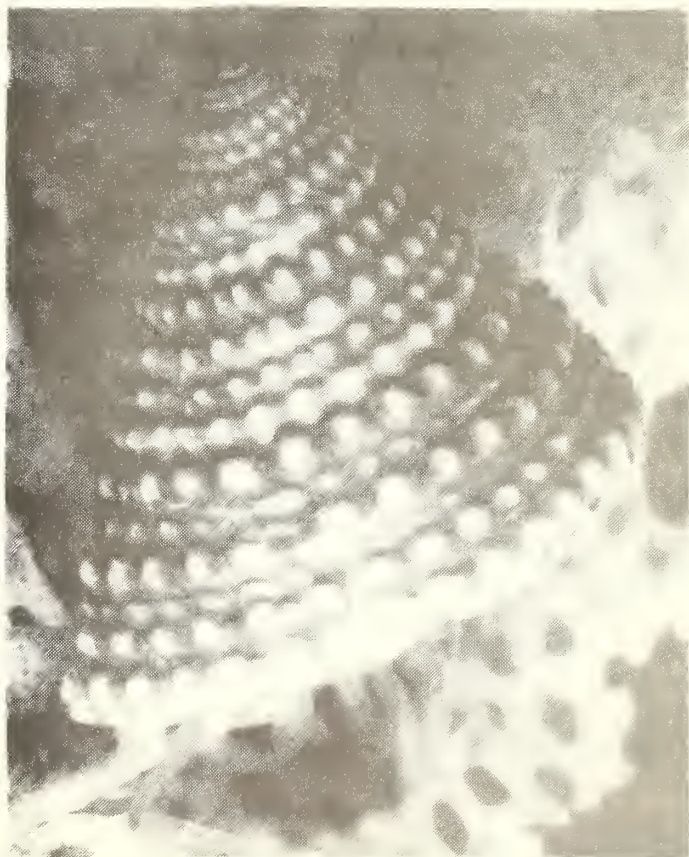
*Calliostoma tricolor*

X10



*Calliostoma gloriosum*

X4



*Calliostoma annulatum* on coralline algae

X8



## BOOK NEWS

Carole M. Hertz

Our Club library has purchased Australian Seashells by Barry R. Wilson and Keith Gillett, published in 1972 by The Charles E. Tuttle Co. of Rutland, Vermont and selling for \$21.50. This is a truly beautiful book. The color plates seem to comprise almost half the book and those showing the live mollusks are breathtaking. Certainly one is made to realize that the inhabitants of many shells are more spectacular than the shells themselves.

The introduction gives the reader a general background of information on mollusks and includes a section dealing with the Australian marine faunal provinces in particular. Most cogent is a strong plea for conservation. "Drawers full of beautifully cleaned and labelled shells will be a poor excuse when, in future years, our children want to know why they can't see things like that living on the seashore."

This book treats only the Gastropoda and of this Class the more "glamorous" families are studied extensively. Others are shown only by representative species or not included at all. To this reviewer, the limited scope of the book is its shortcoming.

The treatment of the families covered is very well done. Each section is prefaced by a short article giving general information about the family i.e. feeding, spawning, habitat and physical characteristics. The descriptions of the particular mollusks are concise, easily understood and placed conveniently--just opposite the plates for ease of reference.

Our members will greatly enjoy "curling up" with this book whether or not they have shells from the Australian waters. It will be available in the library at our next meeting

The Club is also exchanging periodicals with the Crown Point, Indiana Shell Club. Through the generosity of Emma Rose West we have the back issues of their "Tideings" in our library.

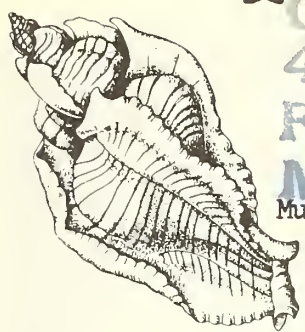
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PLEASE WRITE!! WE NEED YOUR ARTICLES.

SEND US YOUR WORDS AND PICTURES.

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## SAN DIEGO SHELL CLUB

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### BREEDING HABITS AND LIFE CYCLES OF THREE SPECIES OF NUDIBRANCHS FROM THE EASTERN PACIFIC

by David K. Mulliner

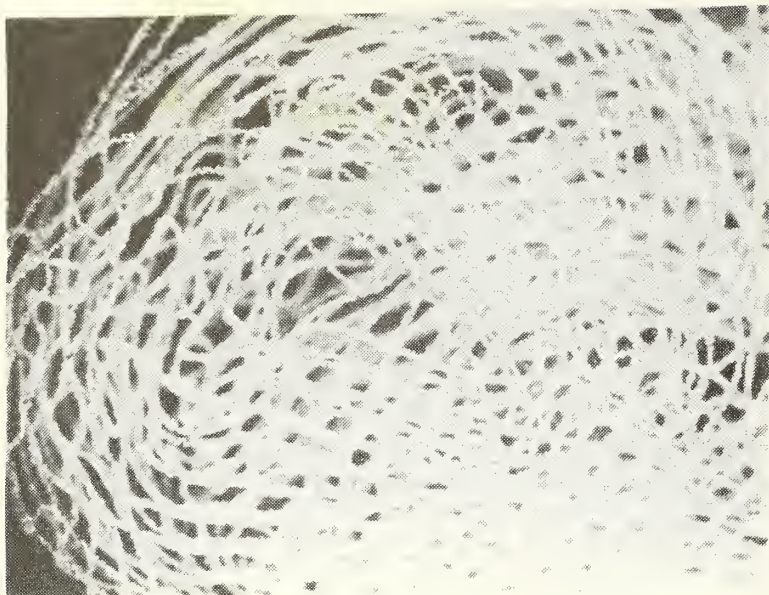
Ed. note. This talk, accompanied by slides, was given by Dave at our August meeting after having been presented by him at the WSM meeting this year. The photography is Dave's and the drawings are by Anthony D'Attilio.



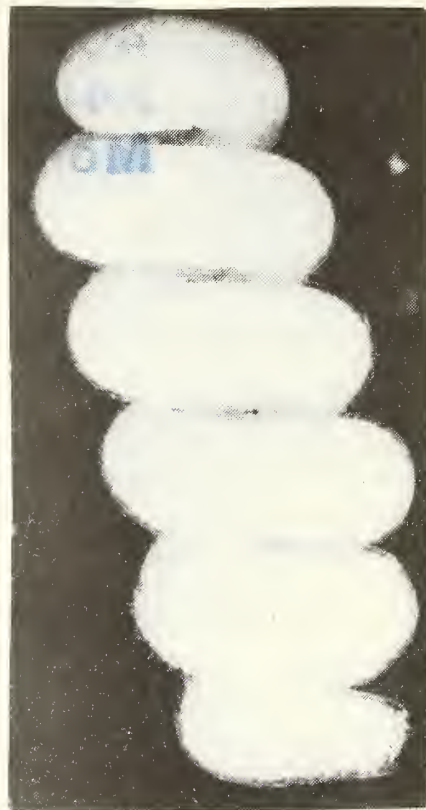
Two copulating specimens of unnamed yellow doris from the Gulf of California.

The breeding habits of the Opisthobranchs are related to the hermaphroditic nature of these animals. The male and female gonads are united in one individual. The mucus gland secretes a jelly-like egg-mass or ribbon. This gland, together with the albumen gland, sperm receptacles, and prostate gland, has sunken deeply into the general body cavity. Each gland may be elaborately subdivided or cut off from the main path as one or more diverticula. In the higher opisthobranchs, such as the aeolidiacea and doridiacea, a central part of the gonad is specialized for formation of sperm with a series of outlying follicles producing the eggs.

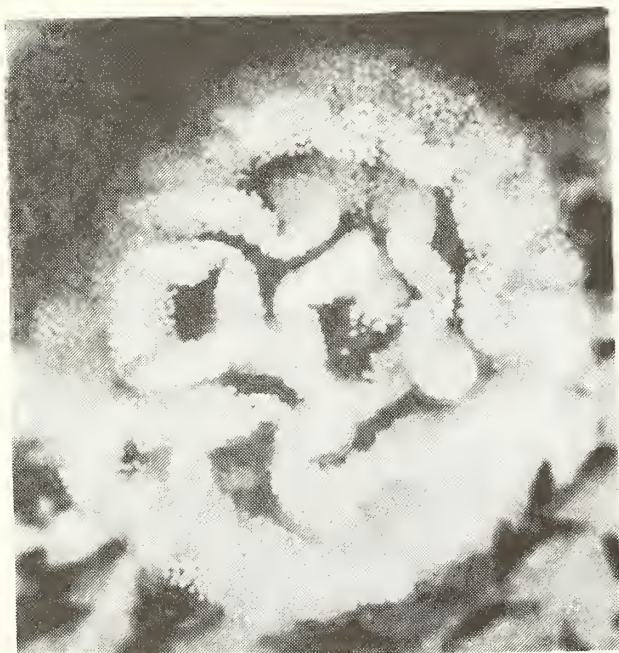




Top left: Navanax inermis (Cooper, 1863) spawn mass. Yarn-like string of capsules, each containing seven eggs.

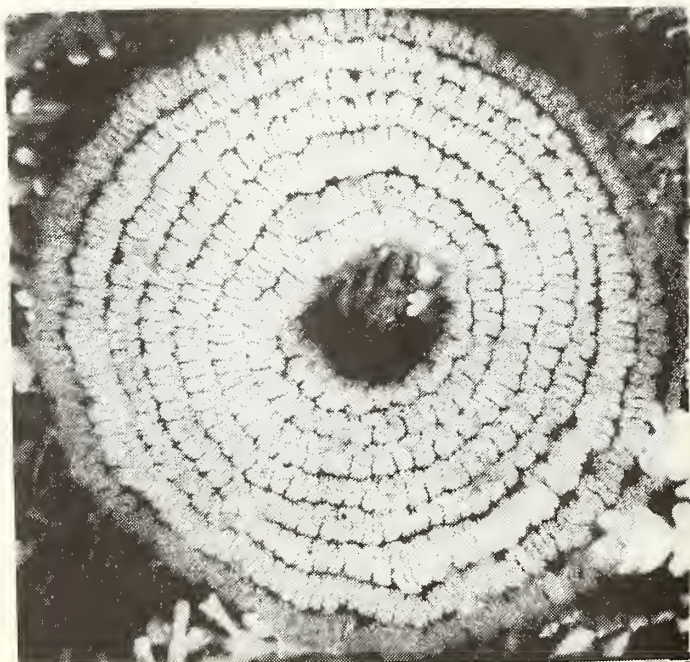


Top right: Acteon punctocaelatus (Carpenter, 1864) spawn mass. Round ribbon laid in a spiral and attached by one end to the sand or mud.



Center left: Hermissenda crassicornis (Eschscholtz in Rathke, 1831) spawn mass. Ribbon attached by one edge and laid in an open zig-zag, circular pattern.

Bottom right: Unnamed yellow dorid from La Jolla, Calif. spawn mass. Round ribbon laid in a close-set, zig-zag, circular pattern and attached by one edge to the substrate.





In most nudibranch groups pairing occurs, passing sperm to the other for eventual fertilization. Anaspidea, on the other hand, forms a copulatory chain in which each animal acts as a male to the one in front and a female to the one behind.

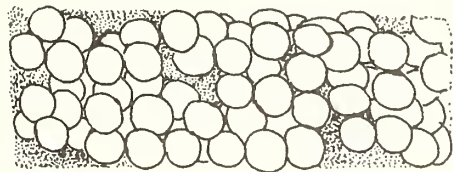
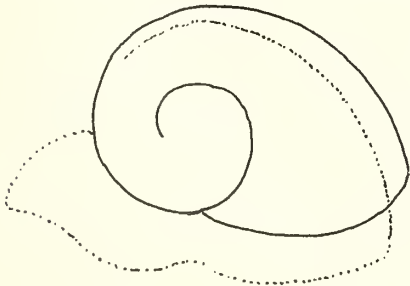
Opisthobranch eggs are easily recognized. The eggs are usually small, each with its own albumen coat and egg membrane, and the whole mass is enclosed in a thick matrix of clear mucus. The bulloids deposit a jelly sphere through which runs a tangled string of eggs. Similar egg-masses of Actæon are club-shaped. The aplyoids put out a long, yarn-like mucus string, deposited in a loose tangle. The pleurobranchs, the dorids, and the æolids produce a broad, flat or round ribbon attached in a coil or in folds to the substrate.

Nearly all species of opisthobranchs produce small free-swimming veligers which hatch early and spend only a short time in the plankton. It has been found that there is a definite relation between the size of the animal and the size of the egg-mass, and consequently, the number of eggs it contains. There is considerable variation in the shape of the egg-mass though in all cases the eggs within the ribbon are compartmented into capsules which may contain only one egg or as many as twenty.

In Opisthobranchs, three distinct developmental types can be recognized. Type 1 includes those species which possess planktotrophic larvae. These animals lay the smallest size eggs and the largest number per spawn-mass. Type 2 comprises the species which have lecithotrophic larvae. The eggs are larger than in Type 1 and of fewer number per spawn-mass. Type 3 has a direct development. The eggs are about twenty times the volume of Type 1 and of fewer number per spawn-mass.

Species with planktotrophic larvae produce small ova in large batches. The veliger embryo hatches after a short period of 2 - 28 days depending on culture temperature and species differences. The free swimming larvae usually lacks eyes and is without visible propodium rudiment, but possess a well-developed velum, subvelum, larval retractor muscle, larval kidney, pair of nephrocysts, metapodial mucus-gland and operculum. The larvae possess a cephalopedal feeding apparatus by which they capture the micro-organisms which constitute their diet. The normal swimming phase probably exceeds three days.

An 80mm long specimen of Triopha grandis produced 400,000 eggs per egg-mass in an aquarium. Each capsule contained an average of eighteen eggs. Observations were made daily on the developing larvae. On the sixth day the larvae hatched as free swimming, planktotrophic veligers.



Veliger of Triopha grandis,  
MacFarland, 1905

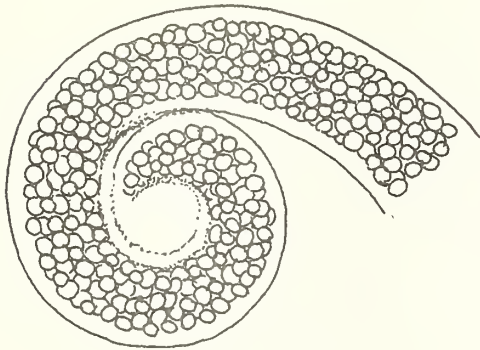
Eggstring of Triopha grandis

Species with lecithotrophic larvae produce larger eggs in smaller numbers per spawn-mass. The capsules contain from one to five eggs. The

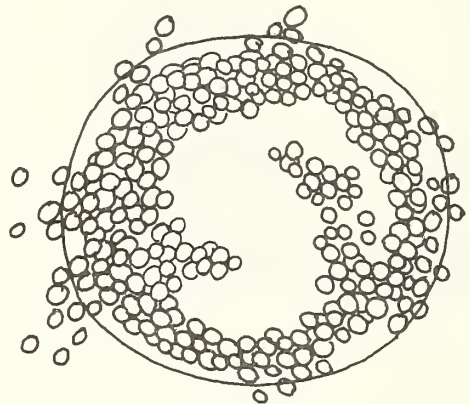
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embryonic period is longer, 4-42 days, depending on culture temperatures and species differences. The free swimming larvae possess eyes, radula, a recognizable propodium-rudiment, velum, subvelum, larval retractor muscle, larval and adult kidneys, metapodial and propodial mucus glands and operculum. Such larvae usually swim on hatching and will take food if available; however, it is not essential to their survival. The swimming phase does not exceed two days.

A 15mm long specimen of Aeolidiella takanosimensis produced 600 eggs, one per capsule, in a collecting bucket. Eggs collected at Dana Landing in San Diego hatched into lethargic larvae that immediately sank to the substrate and crawled but did not swim. (The Aeolidiella takanosimensis is a Japanese aeolid that is continuously introduced to Southern California via shipping, along with its food, the anemone Halipanella sp.)



Spawn mass of Aeolidiella takanosimensis. Baba, 1930

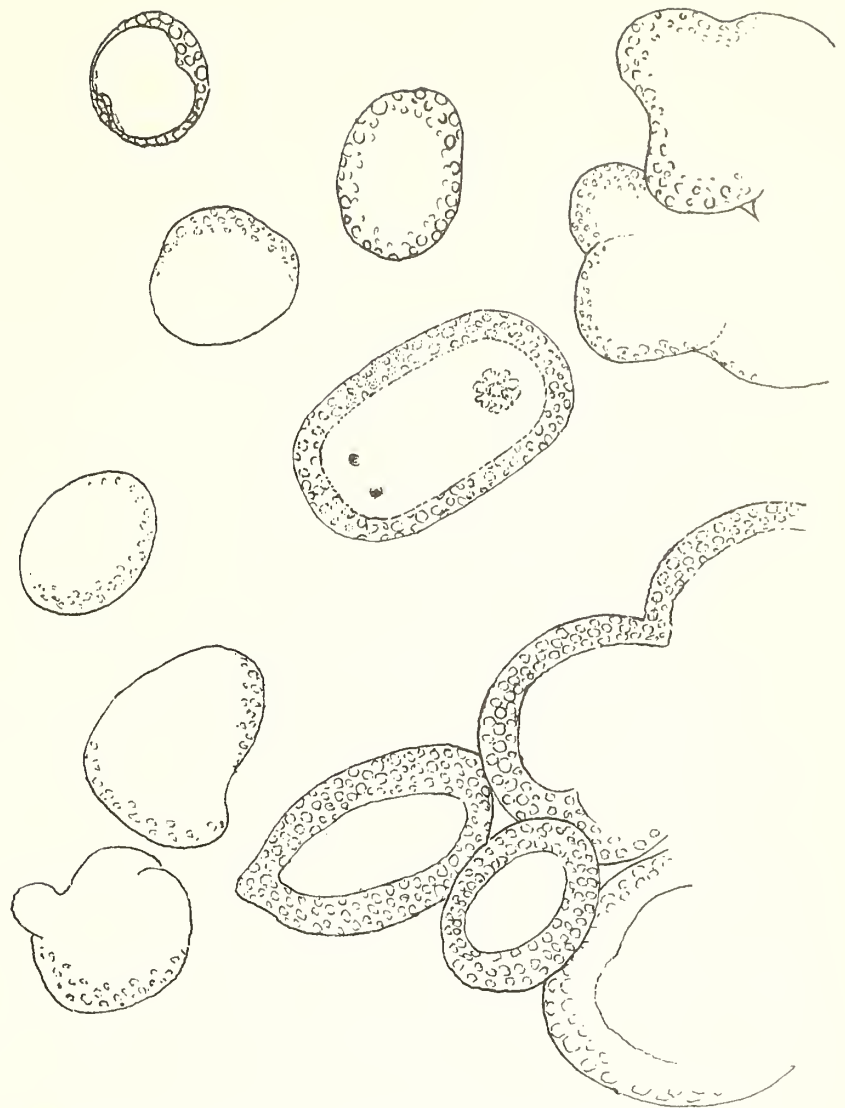


Spawn mass hatching of Aeolidiella takanosimensis

Species with direct development produce large eggs in smaller batches per spawn mass. The eggs are always one per capsule. The embryonic period is the longest of the three types, 13-50 days, depending on culture temperatures and species differences. The newly hatched juveniles lack nephrocysts, larval retractor, muscle, velum, subvelum, metapodial mucus gland, external shell and operculum: the mantle fold has become reflected to form part of the dorsal integument; eyes and radula are usually present.

A yellow porostome was collected at Bahia de Los Angeles in the Gulf of California by Mr. J. Lance. The egg mass contained 400 eggs, each in its own capsule. The larvae developed without forming a shell within the capsule. The hatched juvenile was in the form of a miniature version of an adult. The rhinophores broke through a thin membrane and became functional within a few hours.

Gulf of California porostome,  
eggs hatching.



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Elsie O'Donoghue, B.A.

Direct Development in a Nudibranch, *Cadlina laevis*, with a discussion  
of Developmental Processes in Opisthobranchia by T.E. Thompson, Zoology  
Dept., University of Bristol

Studies of Opisthobranchiate Mollusks of the Pacific Coast of North  
America by Frank Mace MacFarland

Molluscs by J. E. Morton, Professor of Zoology, Auckland University, N.Z.



LOG FROM THE AMERIPAGOS EXPEDITION (second installment)  
By Dave Mulliner

February 24, 1971 - Lima, Peru The early morning sun is warm and bright in this oldest of American cities established by the Spanish. The stores and even the banks open at 7:00 a.m. and close at 11:00 a.m., some of them open again in the late afternoon.

After a breakfast of papaya, mango juice and scrambled eggs, we went shelling on the jetties that project out into the ocean to protect the shore. The animals collected were chitons, littorines, limpets, fissurellas, thais and acanthina. The waves break so hard on this unprotected shore that we got soaking wet as each wave rolled along the jetty. (Bill Old is separating and identifying the shells collected along this coast and will be sending each of us our share soon.)

Bill Old called a friend, Edgar Bauer (a former member of the New York Shell Club). Edgar helped tie the chitons and then took us on a tour of Lima. Later we went to see his collection of local shells including several unnamed dorid nudibranchs.

February 25 - Cusco This morning we flew to Cusco, the Incas' ancient city of the sun, 11,000 feet high in the Andes. We toured the Inca ruins above the city, an Indian village alongside ancient ruins, collected land snails and shot pictures of the Indians and the llamas. Later we all had a touch of mountain sickness. The local remedy is "Te de coca", a tea brewed from leaves that contain cocaine.

February 26 The train to Machupicchu goes forward, then backward up the switchbacks of the steep hills surrounding the city of Cusco. We followed a raging river through a gorge in the Andes. In places the river widens into verdant cultivated valleys with Indian villages built along the tracks. Now we pass through jungle type growth, orchids, fuschias and many tropical plants.

At the station we changed to minibuses for the steep 1,500 ft. ascent to Machupicchu, the ancient ruins of the Incas. The ruins are so remote that they were not discovered until 1908. We toured this fantastic Inca city of the ancients and took many pictures. Here we collected land snails along the walls in the grass. Later, the hotel manager told us the poisonous snakes also hide in the grass along the walls.

February 27 - Lima, Peru Edgar Bauer met us at the airport and took us to his house where we met an ichthyologist from the museum and two young friends. They had planned a collecting trip to Pucosano, a resort bay fifty miles south of Lima. The collecting was good for both the shore collectors and the skin divers. After dinner we caught the midnight flight to Guayaquil, Ecuador.

February 28 - Salinas, Ecuador Eighty miles north of Guayaquil is the port city of Salinas. The drive from Guayaquil is through beautiful green country, until suddenly about 50 miles out, the green ends and dry desert begins. Our hotel is one block from the beach. We snorkled and shell collected all afternoon. The evening collecting was done with kerosine torches.

March 1 - Guayaquil We purchased batteries for the dredge and checked in at the Continental Hotel. Fernando Aviles asked us to his beautiful home for a reception and dinner party.

March 2 - Guayaquil Took Gale Sphon, Ellen Brennan, Jackie Grundman, Twila Bratcher and Bill Old to the airport for the flight to the Galapagos Islands. Carolyn and I stayed behind to get our equipment shipped out to the Islands on the boat.

March 3 - Guayaquil Most of the day was spent repacking our equipment. Customs had broken open everything. Mr. Maenz, the Darwin Research Station agent, called to say we could bring our gear to the boat. Fernando Aviles and Sr. Alijon helped us bring the 25 boxes, duffels and suitcases to the dock. The equipment is now aboard the Mallarca and the Captain says he will leave on Saturday. We were finally able to confirm our flight to the Galapagos on March 5.

March 4 Fernando arranged for us to receive a special letter from the Navy to be given to the port commander on Santa Cruz Island. Sr. Maenz brought us mail to be delivered to the Darwin Station. Today is our first chance to leisurely shop for gifts and to visit the native market place. Tomorrow we will finally get to the Galapagos.

David Mulliner has been studying and photographing marine creatures for some seven years with a particular and ever-increasing interest in nudibranchs. He photographs them underwater in their home environment and also in laboratory settings, using magnification. Then, too, he comes running ("the cameraman who makes housecalls") when fascinating things are happening in aquariums.

He has become very expert in the use of his fine Nikon cameras and has made many, many beautiful pictures. Recently he exhibited in the 1972 West Coast Shell Show at Santa Barbara and received first place in Class W-Living Mollusks and first, second and third place in Class Y-Nudibranchs, with a special silver trophy bowl and ribbon presented by Anderson Camera for the Best Photographic Entry of the show-- a slide of Acanthodoris rhodoceras.

In August 1970, he was made a research associate of the San Diego Museum of Natural History and in March 1971 was a member of the Ameripagos Expedition to the Galapagos Islands.

He has made twenty-four full-page color plates of more than three hundred shells to illustrate a book on Muricidae by Dr. George E. Radwin and Anthony D'Attilio soon to be published.

#### NEW MEMBERS

FAULCONER, Mr. & Mrs. Philip  
4424 Osprey  
San Diego, 92107  
222-9276

ROBILLIARD, Gordon  
3489 Kurtz St.  
San Diego, 92110  
225-9381

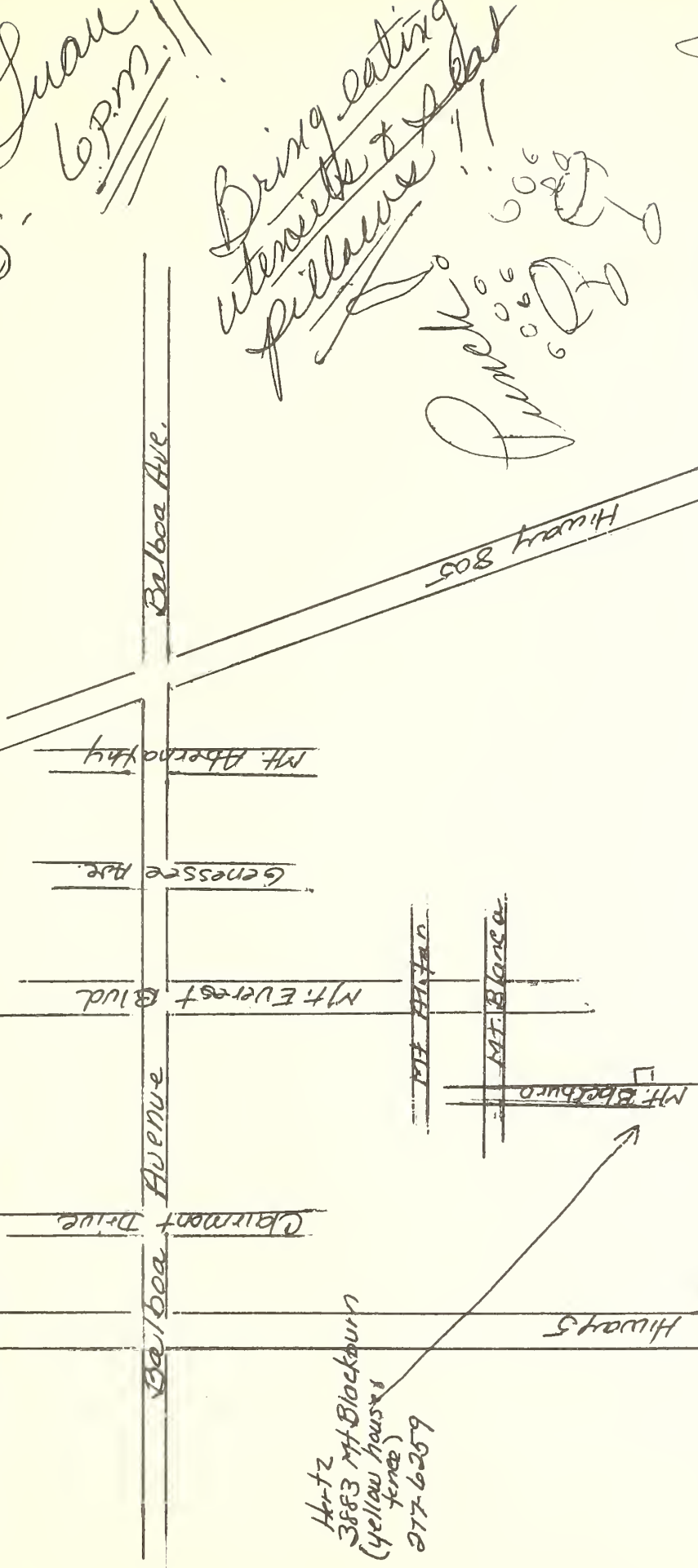




Balboa Ave. Exit

Balboa to Mt. Everest Blvd.  
Right onto Mt. Everest for 2 blocks  
Right onto Mt. Blanca for one block  
Left onto Mt. Blackburn - mid-block.

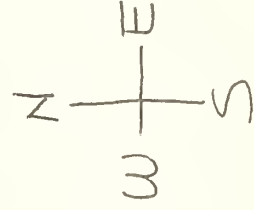
Hertz  
3883 Mt. Blackburn  
(yellow house & fence)  
277-6259



Come to the Juan  
Sept 15 - 6pm.!!

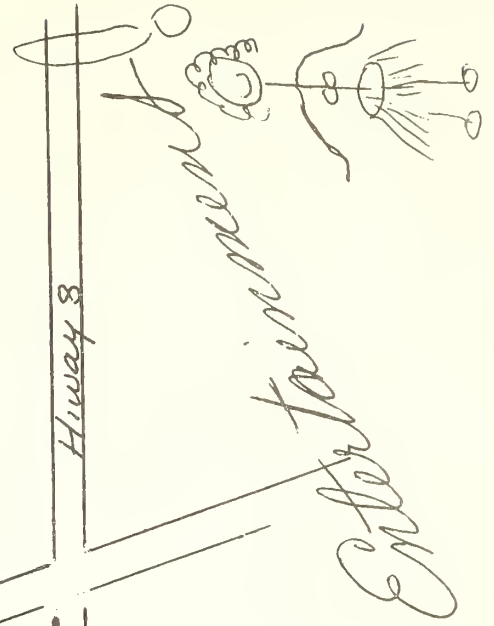
Bring eating  
utensils & seat  
pillows!!

Fun!!



From Highway 8 take  
805 to Balboa Ave. (exit west)  
Balboa to Mt. Everest Blvd.  
Left onto Mt. Everest for 2 blocks  
Right onto Mt. Blanca for one block  
Left onto Mt. Blackburn - mid-block

Good Companion S



\*\*\*\*\*

-IMPORTAT-

SAVE THIS DATE

FRIDAY, SEPTEMBER 15, 1972

Come To

A BIT OF POLYNESIA

at Hertz Island--just east of Hawaii

It will be Club Luau time. Plan to wear your best Polynesian attire and come and enjoy good friends and good food. More details will follow later. If you want to help, call Carole Hertz, 277-6259. But in any case---

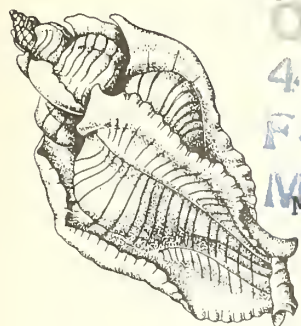
SAVE THE DATE ----FRIDAY, SEPTEMBER 15, 1972.

\*\*\*\*\*

SAN DIEGO SHELL CLUB  
c/o N. Michel  
4758 Mt. Cervin Dr.  
San Diego, Calif. 92117

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## SAN DIEGO SHELL CLUB

FOUNDED 1961 • INCORPORATED 1968

Museum of Natural History - Third Thursday - 7:30 P.M.

President: Clifton Martin

Vice President: John Michel

Recording Secretary: Clifford Martin

Corresponding Secretary: Jeanne Pizor

Treasurer: Kay Taylor

Editor: Blanche Brewer

Annual Dues: Single membership, \$3.00 - Family, \$4.00 - Corresponding membership, \$2.50 - Overseas corresponding, \$3.50. Payable to San Diego Shell Club, 2437 Aster St., San Diego, Ca. 92109.

Vol.III

October 1972

No.10

\*\*\*\*\*  
\* PROGRAM for October 19.1972 \*  
\* Marine Biology of Antartica, Dr. Gordon A. Robilliard \*  
\*\*\*\*\*

### CLUB LUAU ENJOYED BY ALL

Club members enjoyed their own bit of polynesia at a luau on the evening of Sept. 15th at the home of Jules and Carole Hertz. Lanterns and soft lights in the greenery, soft Tahitian music in the background, low tables decked with palm fronds and ginger blossoms, and a large tiki overlooking the whole scene -- who could ask for more? Our hosts for the evening, Jules & Carole, greeted us dressed in native Tahitian pareu, as was brave Dave Mulliner who took pictures of the festivities throughout the evening.

Dave's punch, along with tempting hors d'oeuvres served by two charming vahinis, made the happy hour a very happy one. At the buffet, adobo was served as the main dish and was so good it called for seconds. The fruits were luscious even to look at. Later we enjoyed Hawaiian dances by Billee & Twila, and Carole completely surprised us by appearing with her guitar and singing ditties of neighboring isles.

It seemed as if everyone came with some touch of Polynesia, be it hei or lei or a warm heart. It was a happy, mellow evening, and our sincere thanks to Jules & Carole for their always warm hospitality.

So many have asked for the recipe for the adobo, we are including it as follows: CHICKEN & PORK ADOBO, from the kitchen of Billee Dilworth.

1 C. fresh or dried grated coconut, 1 C. water, 3½ # uncooked chicken, cut into serving pieces, 3 # boneless pork, cut into 2" cubes, ¼ C. olive oil, 6 cloves garlic, 1 T. salt, 1 t. pepper, 4 whole peppercorns, 2 bay leaves, ½ C. stock, ½ C. red wine vinegar.

Combine coconut & water, bring to boil & remove from heat. Soak 30 min. Press out all liquid from coconut, discard pulp, reserve liquid. Wash & dry chicken pieces. Heat oil. Add chicken and pork, saute 'til brown. Pour off excess oil, add remaining ingred., except coconut milk. Cover, cook over low heat 1 hr. or until tender. Stir frequently. Add coconut milk, cook 10 min. more, correct seasonings. Serve over rice.



## SAMOAN HIDEAWAY

by Billee Dilworth

2

Apia, Western Samoa, was the last stop on our Tonga Expedition. If we had not compared it with the island of Uia, which is in the Ha'apai group of the Tonga Islands and thirteen hours away by boat, from the tourist path, it would have seemed primitive and remote from tourism. The houses away from the center of town are open-sided fales woven of palm. The island itself is lush and green with many rivers, streams, waterfalls, and quiet lagoons, and it is surrounded by a fringing reef. But our enthusiasm for collecting in those beautiful lagoons was considerably dampened at the sight of outdoor toilets over the water's edge.

Because of the pollution of the lagoon water and the bustle of the town, plus the fact we'd been gone quite a while, we decided to leave with the group as scheduled after only two days in Western Samoa. George and Bunny Cook, who had planned to stay over with us, decided to leave too. No available plane reservations. So we stayed. We moved to the Samoan Hideaway Hotel on the other side of the island, and before the drive over the mountains was half over, we were glad we stayed. We didn't change our minds. The tremendously high falls, completely surrounded by green jungle, pouring into the pool beneath and the species of huge tall banyan trees that made our taxi look like a child's toy were alone worth the trip.

That side of the island had unpolluted lagoons. The hotel was everything we could have hoped for. The cottages are of wood, shaped like Samoan fales without open sides. Excellent food with course after course seemed never to stop coming. One course we were served frequently was crunchy Caulerpa. We hoped it was gathered nearby so we could search for Lobiger and the Pacific bivalved gastropod, Julia, but it was too far away. No Julia in the Caulerpa we ate.

The cottages faced the sand beach with a view of waves crashing on the outer reef. On the north side of the hotel property a quiet river flowed into the sea and rose and fell with the tide. We found Littorina on the mangroves which grew out of hard packed beach sand on the river's edge.

The hotel's outrigger canoes were at our disposal. They're a little tricky, and we were lucky that George and Bunny were experienced at handling them. George had been on the racing team in Honolulu. We did manage to flip one, sending us all flying into the water, but the only piece of equipment that fell out was Twila's face mask. We recovered that after a few minutes of searching.

We went sand tracking in the quiet water after dawn when the tracks were fresh; we tracked at night with underwater lights when the sand dwellers were out of the sand and exposed; we searched the inner side of the reef both by day and with lights; we turned coral heads (turning them back of course). All of those methods produced interesting results.

The following is a list of the Conus, Terebra, Mitra, and Cypraea plus the two Strombus we had not collected in Fiji or Tonga. These were collected during our three day stay at the Samoan Hideaway Hotel.

Strombus dentatus Linne, 1758  
Mitra coronata Lamarck, 1811  
Mitra tornata Reeve 1845  
Mitra pacificum Reeve, 1845  
Imbricaria olivaformis Swainson, 1821  
Conus litteratus Linne, 1758  
Conus pulchellus Hwass, 1792  
Conus suturatus Reeve, 1844  
Conus virgo Linne, 1758  
Conus vitulinus Hwass 1792  
Terebra affinis Gray 1834  
Terebra laevigata Gray 1834  
Terebra crenulata (Linne), 1767  
Terebra subulata (Linne), 1767  
Cypraea asellus Linne, 1758  
Cypraea cicercula Linne, 1758  
Cypraea moneta Linne, 1758  
Conus marmoreus bandanus Hwass, 1791

Strombus lentiginosus Linne, 1758  
Mitra chrysostoma Broderip, 1836  
Mitra rubritincta Reeve, 1844  
Vexillum porphyreticum Reeve, 1844  
Conus eburneus Hwass, 1792  
Conus imperialis Linne, 1758  
Conus pennaceus omaria Hwass, 1792  
Conus striatus Linne, 1758  
Conus textile Linne, 1758  
Conus sugillatus Kiener, 1849  
Conus panniculus Lamarck, 1810  
Terebra babylonica Lamarck, 1822  
Terebra dimidiata (Linne), 1758  
Terebra maculata (Linne), 1758  
Terebra undulata Gray, 1834  
Cypraea arabica Linne, 1758  
Cypraea annulus Linne, 1758

Western Samoa turned out to be a delightful expedition, quiet, good collecting, and the comforts of civilization which were by this time very welcome. We're glad to have missed the plane.

#### BOOK NEWS

Carole M. Hertz

The Club has received A New Mitrid From the Western Atlantic by George E. Radwin and Loyal J. Bibbey from TRANSACTIONS of the San Diego Society of Natural History, Vol. 17, No. 7, 31 August 1972. Mitra (Pleioptygma) helenae was named for our former member, the late Helen Thompson. It was acquired by our member, Ivan Thompson, from Captain Jack Casey who had collected two of them in December 1971 from lobster pots on Cay Sal Bank between the Florida Keys and Cuba. The TRANSACTIONS contains, in addition to the research and description by its authors, a beautiful color plate of this new mitrid photographed by Dave Mulliner with protoconch drawings by Anthony D'Attilio. This TRANSACTIONS will be available for purchase at our next Club meeting.

Also received this month is the Smithsonian Contributions to Zoology, No. 121, Cirrate Octopods with Associated Deep-Sea Organisms: New Biological Data Based on Deep Benthic Photographs (Cephalopoda), by Clyde F.E. Roper and Walter L. Brundage Jr. This 46 page booklet with 27 photographs of benthic, cirrate octopods adds considerable information to the little studied area of deep-sea mollusks and will be of special interest to those who study the octopus. The photographs by U.S. Naval Research Laboratory personnel show the benthic cirrate octopods in their natural habitat in depths from 2,500 to greater than 5,000m.

A complete set of The Veliger (Vols. 1-14) has been received from an anonymous donor. Our thanks for this valuable addition which will be placed in the library as soon as they are bound. A complete set is already available and this writer is surprised that it is not checked out more often.

We are now exchanging publications with the Philippine Shell Club. Former issues of their publication Philippine Shell News are in the library and we are happy that this club has begun publishing their News once again. The new issues will be in a pink binder.

We will continue to exchange with Molluscan Digest. Private subscriptions of this publication can be arranged by writing to Jack Brookshire, 2962 Balboa Ave., Oxnard, Calif. 93030.



4

# LOG FROM THE AMERIPAGOS EXPEDITION (Third installment)

By Dave Mulliner

March 5 Santa Cruz Island Darwin Research Station. The flight from Guayaquil to Baltra Island by a TAME Airline DC-6 took three hours. We are now 650 miles to sea from Ecuador. There are fifteen major islands in this archipelago; the largest is 80 miles long. Mike Harris from the Darwin Station met us; he had received our radio message and had a fishing boat there to take us to Santa Cruz Island. Dr. Cramer, the director of the Darwin Research Station, met us at the dock and took us to the dorms where we met the other members of our expedition and Sir George, the land iguana.

March 6 Darwin Station Breakfast in the main dining hall built on the edge of the sea overlooking Academy Bay. We visited the DeRoys across the bay, saw their shell collection, and enjoyed the hospitality and shell collecting advice of this wonderful French family who have settled in the Galapagos Islands. We stopped at the Angermeyers for some more advice and to see their shells. Most of the Darwin Station collection was donated and set up by Carmen Angermeyer.

After lunch, we snorkled near the station and up at the fish traps. We found very few shells close to the shore because of the underground infusion of fresh water into the bay. In the evening, Dr. Cramer asked us all to his house where we drank beer and yakked; this was our Saturday night out.

March 7 Darwin Station The Galapagos Islands are volcanic desert islands lying on the equator. The shore and lowlands are cactus and shrub brush. Today, we hiked to the highlands, the path cobble volcanic stone. We passed through desert gradually changing to poplar trees, tropical undergrowth, and then to tall balsa trees. The little village of Mar Vista is four miles up the mountain. Here it is green from the rains; avocados and bananas growing and herds of cattle are seen in the lush grasslands.

Three of us headed up the mountain where the cross is, and in the high meadow, saw beautiful deep pools of water surrounded by tropical vegetation.

March 8 Darwin Station We headed for a small island just outside the bay to snorkel dive. The water was rough and deep; even 20 feet from the shallowest shore the water was over 25 feet deep. Twila made two dives and brought up two badly encrusted Murex princeps.

Then on to the bay near the DeRoys and found some cones and Thais moloni

Spent the evening shooting pictures of shells and nudibranchs in the lab.

March 9 Darwin Station Headed for a cove six miles from the Station in Lopez's boat, a twenty-foot sail type boat with a motor and no keel; it pitches and rolls wildly in the lightest seas. The cove was pure mud; visibility about 4-inches.

Large Purpura columbrias were high above the tide in the rocks; this was the only shell collected.

We received word that the boat Mallarca with our equipment is still in Guayaquil and won't leave for another week. We pickled nudibranchs and worked in the lab.



March 10 Darwin Station Seven hours aboard a small fishing boat headed for Sullavan Cove on Bartholome Island. The crew caught a Tuna, trolling. After it quit raining, we had fish and rice for dinner. The boat dropped us and camping gear on the beach. We set up camp and wandered along the tropical beach in the light for a brilliant moon. The mosquitos and gnats are awful; some of the spray repellants help; mosquito nets are essential.

March 11 Sullavan Cove We dove in front of the camp and came up with cones including C. dalli, Thais moloni, and Murex princeps. We snorkled and shore collected in Bartholome Cove on the other side of the island.

Fishing is easy; just swim out over the reef and lower a hook and line beneath you in front of the fish that is about the right size and good to eat. I caught two nice fish for dinner this way.

It's raining again; Twila and Jackie braved the warm shower to finish cooking dinner---Good conch and crab cocktail, potatoes, and fish.

March 12 Sullivan Cove Bright tropical sun; coffee, cookies. We headed for Bartholome Cove and cool shade. I have an ear infection, so couldn't go in water. Gale got some good nudibranchs tide pooling; Twila and Jackie are out snorkling

March 13 Sullivan Cove The sea turtles have been laying eggs under the bushes in the sand in both coves; we took pictures of them. Carolyn found Scalina billiana in the tide pools under rocks. I caught one lobster. Some cones were collected.

The fishing boat Cristo Rey arrived to take us back to the Darwin Station. The adventure of camping on a desert island will be remembered for a long time, including the mosquitos, gnats, sand, and rain.

ANOTHER NAME TO CHANGE  
By Clifton Martin

In the recently published work, "The Geology and Paleontology of the Marine Pliocene of San Diego, California (Paleontology: Pelecypoda)", by Leo George Hertlein and U. S. Grant, IV; Memoir 2 (Part 2B) of the San Diego Society of Natural History, a name change has been indicated in a species of the recent Pectinidae, pp. 211 - 212.

Hinnites giganteus (Gray) = Lima gigantea Gray, 1825

In Transactions of the San Diego Society of Natural History, Vol. 5, No. 9, February 29, 1928, Hoyt Rodney Gale proposed the name "Pecten (Chlamys) multirugosus" for this species because of the earlier Plagiostoma gigantea J. Sowerby, 1814. He considered Plagiostoma to be a subgenus of Lima, making Gray's species a secondary homonym. However, Plagiostoma J. Sowerby, 1814, was originally proposed as a genus and is so used by many authors and as such Lima gigantea Gray is not a homonym, therefore the specifec name "giganteus" is valid.

To quote Hertlein and Grant, "If the name Hinnites giganteus be abandoned the next available name is "Hinnita" poulsoni Conrad. This name is not a homonym of the earlier Pecten poulsoni Morton, as believed by Grant and Gale".

From SEA SECRETS

QUESTION: While diving in waters off Jamaica, I frequently observe helmet shells with the growth stages completed, but never any in a partially completed growth stage. Where do these snails go to add a growth stage and how long does it take? Also, what is the age of a fully grown helmet shell? S.S., Jamaica, West Indies.

ANSWER: Helmets retire to some quiet place when new growth is to be added to the shell. To the best of our knowledge, no one knows how long it takes for a helmet to reach maturity, because controlled laboratory experiments have not been carried out with these snails.

NOTICE-- NOTICE

The San Diego Shell Club is sending Nola Michel to represent our collectors at the meeting of the State Fish and Game Commission on Oct 6 1972. This meeting is the meeting in which proposals for changes to the existing regulations should be given. We would like to have our members in Calif. get the following page filled with signatures of adults, and mail it to the return address on the other side. We will see that they will reach the F. & G. Commission. If each one of you will sit down and write a personal letter, that too would probably mean much in the eyes of those who have the power to change the law. As the Executive Secretary of the F. & G. Commission stated in a letter to Mr. Walter Sage, of Kentucky, "At such time as California's conchologists indicate that the present regulations are imposing unnecessary restrictions on their activities, the Commission will consider amendment of its existing regulation." So write to this man and tell him how you feel. The address is,

State of Calif. Fish and Game Commission  
Leslie F. Edgerton, Executive Secretary  
1416 Ninth St., Sacramento, Cal. 95614

If any of you can personally attend this meeting, by all means do so. It's on Oct. 6 1972, 9AM; Auditorium of the Resources Bldg., 1416 9th St. Sacramento, Ca. Other meetings ~~are~~ being held also.

I understand they are to be open to the public.

OCT 6, 9:00 AM, Auditorium of the Resources Bldg., 1416 Ninth St., Sacramento, To receive proposals for changes in the existing regulations.

NOV. 3, 9:00 AM. Board of Supervisors Chambers of the County Court House Bldg. Redding, To discuss changes recommended at the Oct. 6th meeting.

DEC. 8, 9:00 AM, Room 1138 New State Bldg., 107 S. Broadway, Los Angeles. To adopt changes in regulations which will become effective MAR. 1, 1973

We hope that some of you will be able to attend at least one meeting!

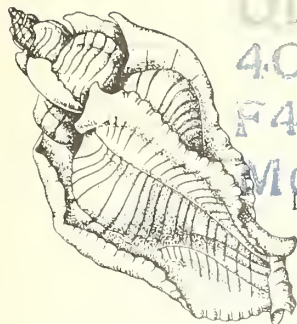






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Vol.III

NOVEMBER 1972

No.11

PROGRAM for November 16, 1972

Underwater Film on barrier reefs of British Honduras

Filmed by Al Giddings, presented by Bud Hazen

FRI

DECEMBER CHRISTMAS PARTY at Mirmar NAS, CPO Club-- Red Room, DEC 22

No-host bar at 6 PM - Dinner at 7:30 PM Reservations Only

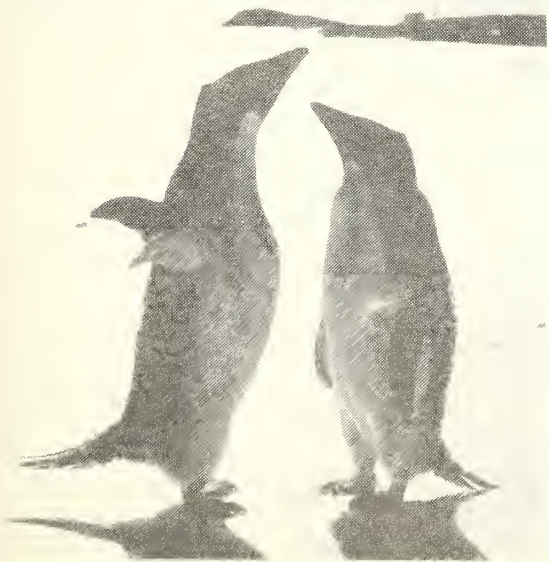
Prime Rib - \$4.50 Steak & Lobster (same plate) \$5.50

Send all reservations to John Michel, 4758 Mt. Cervin Dr.

San Diego Calif, 92117. Reservation accepted until Dec 15.

### MARINE BIOLOGY IN ANTARCTICA

by Gordon A. Robilliard



"You should have seen the one that got away!" Adelie penguins near McMurdo Station. These small (10 - 14 inches tall) birds, resplendent in their "tuxedos", are unafraid of people and will come right up to you. They feed primarily on small fish and euphausiids or "krill".

Text on following pages -----

Study of the marine benthic communities of polar regions, especially the Antarctic is a virgin field for a hardy and enterprising biologist. The marine environment is so rigorous and adverse as to be unique, both in its physical characteristics and in the animals present.

It was this combination of characteristics that prompted Dr. Paul Dayton, now a professor at Scripps, and myself to do a research project near McMurdo Station, Antarctica while we were graduate students at the University of Washington. We planned to study the effects of predation by large motile predators such as seals, fish, starfish, gastropods, and others on the sessile benthic fauna, i.e., hydroids, sponges, clams, bryozoans. Secondly, we intended to: inventory all the species that we saw; determine their size-frequency and population size; describe their feeding habits, behavior, and natural history; collect representative samples of most species; and photograph as many as possible. After we began the project, we found it necessary to determine the respiration rates and several other physiological parameters of the major species present.

This ambitious research program was executed in October - December, 1967 and 1968, by scuba diving under what might be termed "rigorous" conditions. Water temperature was about 28°F (-1.8°C) year round, and 6 - 8 feet of ice covered McMurdo Sound while we were there. Horizontal underwater visibility ranged from 600 feet in October to 200 feet in early December to two feet in December 18 (at which point we departed for home). The standard "Farmer John" wet suit was slightly modified in deference to the colder water, but relatively few other equipment modifications were necessary.

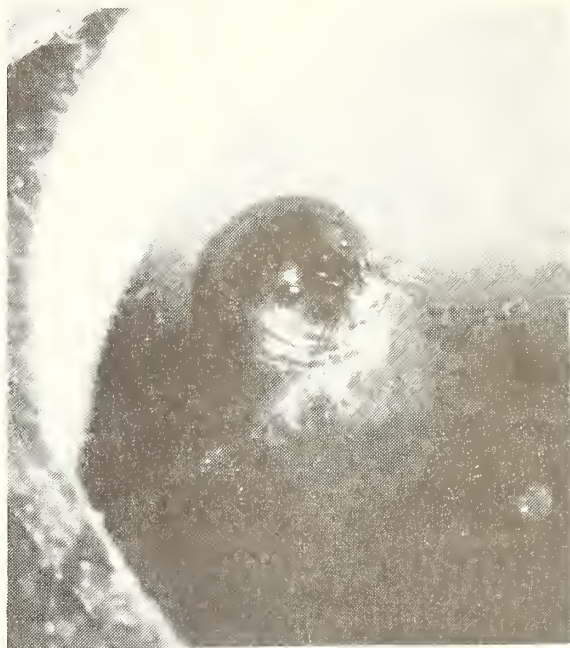
Fig. 1 Blasting a hole in  
six feet of sea ice  
prior to a dive.  
Mt. Erebur, an active volcano,  
is in the back ground.





We occasionally made open-air dives through cracks in the ice, but we usually we blasted a hole in the ice (figure 1), pulled a 10x20 heated fish house over it, and dove through a hole in the floor (figure 2). Almost invariably, the curious and friendly Weddell seals would be attracted to this huge "breathing hole" giving us a diving partner whether we liked it or not.

Fig.2 Juvenile Weddell Seal using our diving hole in the heated fish house as his breathing hole. This friendly yearling was later displaced by a large, aggressive bull seal.



The first dive in the Antarctic waters is breathtaking, partly from the cold shock and partly from the fantastic size, form, color, and diversity of the benthic fauna that is visible in the crystal-clear water. Except for several species of jelly fish (figure 3), there is almost nothing in the water column until the December plankton bloom, hence the clarity of water. The dominant organisms in terms of space occupation or biomass per square foot are sponges (figure 4) up to six feet tall and four feet in diameter. Solitary and colonial hydroids, gorgonians (figure 5), sea anemones,

Fig. 3 Gotcha! This huge jellyfish is about three feet across and has tentacles which may be up to 80 feet long. During the first year, we saw this scene repeated several times. The jellyfish float around with their tentacles hanging down in search of prey. When the jellyfish reach shallow water, the tentacles drag on the bottom occasionally coming in contact with these voracious sea anemones. The anemone grabs the tentacle and effectively "reels" itself down to the anemone which is solidly attached to the bottom. The anemones digest the jellyfish with help from predators and scavengers such as other anemones, starfish, nemerteans, and nudibranchs.



Fig. 4 Space Competition. The slow-growing red sponge is being overgrown by the fast growing white "Slimey" sponge. The "Slimey" sponge, named for the copious amounts of mucous produced, may grow to more than 1.5 yards across in just a few years and we observed several situations where it had overgrown other sponge.



anemones, tunicates, bryzoans, tubeworms, and huge pycnogonids(=sea spiders) are interspersed on and between sponges, or crawling over them. Crabs are conspicuous by their absence and, with the exception of the bivalve Limatula hodysoni, the prosobranchs Neobuccinum eatoni (Figure 6) and Trophon longstaffi, and several species of nudibranchs (Figure 7), molluscs are surprisingly uncommon. Fish are rarely seen swimming in the water column. Instead, the small, common, sculpin-like fish tend to hide under sponges, in crevices, and other holes. We were fortunate in seeing an "ice" fish or "bloodless" fish (Figure 8), so called because it lacks any red pigment in the blood. All in all, the color, size, and diversity of marine animals was surprising, the more so because we like most people, envisioned the cold Antarctic as being a marine "desert".

Briefly, our investigations showed that biological interactions in the Antarctic benthos were comparable to any other marine environment on the time scale was much longer. A four inch starfish might be 100 years old; the large sponges might be 5 - 10,000 years old; a large starfish moved three feet in one year and several moved not at all, other starfish took over two months to eat an urchin; a seal's head didn't decay noticeably in at least a 15 month period, and man-made articles such as cans, oil drums, etc. had not corroded even after 10 - 15 years in salt water. However we were able to determine that predation by a small starfish Odontaster validus (Figure 9) plus competition for space by certain sponges (Figure 4) determined the ecological community structure. Predation by other starfish and several molluscs, especially nudibranchs, on sponges was also very important.

Much of this information has been or is being published in several scientific papers. Much more work has to be done before the marine benthic ecology will be fully understood and appreciated, but we hope that we have at least provided a basis for this work.



Fig. 5 Pink Whip gorgonian and Sabellid tubeworm at 140 feet near Cape Evans. These animals plus sea urchins and starfish shown are common animals in this muddy-gravel area.

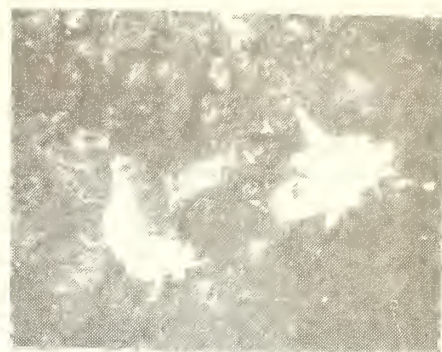
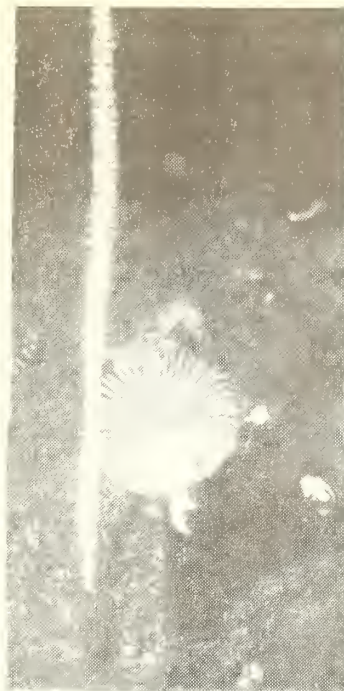


Fig. 6 Gastropod (Neobuccinum eatoni) at 40 ft. near Cape Evans. Their prey was not determined although they may have been eating the bivalve Limatula hodysoni.

Fig. 7 Notaeolidia gigas. This large (up to 5 inches) Eolid nudibranch is considered to be one of the most primitive Eolids. Its prey consists of medusae, stalked hydroids, and the small white stoloniferan anemones shown here.



Fig. 9 Pile On! The large tunicate was originally attacked by the two yellow lamellarians which drilled holes in the tunic to reach the soft insides. The scent of escaping body fluids attracted the voracious scavenging starfish that have "piled on" to get their share of the meal.

Fig. 8 "Ice" fish. These so-called "bloodless" fish lack haemoglobin in their blood; the blood and therefore the gills are white rather than red. They are relatively slow. We caught this small (12 inches) specimen by hand and maneuvered it for photography for 20 min. before releasing it. Very little is known of their natural history except that they eat shrimps and small fish.



## LOG FROM THE AMERIPAGOS EXPEDITION (Fourth installment)

by Dave Mulliner

March 14 - Galapagos Islands Took the Cristo Rey fishing boat to Floriania Island, porpoise following us part way, riding our bow wave. Arrived in Post Office Bay alongside the luxury tour ship, the Linna A, and a New Zealand Sail boat. Mike Harris from the Darwin Station is acting as tour guide and has asked us aboard the Linna A. The tour group were from Cincinnati sponsored by their zoo.

March 15 Snorkled in the bay near Devils Crown - collected Terebra, Neosimnia, Murex princeps, and Facilaria princeps (which make delicious ceviche).

Visited the post office barrel on Post Office Bay - mailed letters and shot some pictures. Back to Devils Crown for more diving and shore collecting. Bill Old and Gale Sphon found Lobiger, Berthelinia chloris and Chiton goodallis. We found cones, thais and murex. Headed back for the Darwin Station.

March 17 The Mallorca arrived from Guauaquil with our equipment. This is quite an occasion for the islanders. Mail and packages, food, and even cattle are brought from the mainland about once a month. Spent all afternoon uncrating and working on the equipment. We can now dive on hooka and with tanks. The dredge will require mounting and rigging before it will work.

March 18 ~~Filled the scuba~~ tanks with the compressor - invited Andre Deroy to go with us. Dove to 100 feet on a reef in Academy Bay. Andre got a clump of black coral. Spent the rest of the day working on the dredge. and one hooka.

March 19 Took the French diver Max to a collecting spot in the bay. Used both scuba and hooka. This was a good sandy bottom collecting area. Getting ready for trip around the islands.

March 20 Plaza Island - We were greeted by seals - a mother and baby had to be chased off the landing dock so we could go ashore. On the islands were many iguanas, nesting tropical birds, and the swallowtail sea gull. We shore-collected and dove along the steep rocky slope of the island. A shark followed me up from deep water to where the others were hooka diving he lay in a sand pocket and just watched us shell-collecting. We saw several sea snakes and very large moray eels. The water here is clear and warm on the surface but cools off quite rapidly as you descend.

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KNOW YOUR FELLOW CLUB MEMBERS  
by Clifton Martin

This paper is the result of a request that I write an article for *The Festivus* based on those members of our club who have had shells named for them or who have themselves described new species of mollusks. It became obvious quite soon that such an assignment would be impossible to completely fulfill due to the limitations of my research facilities. It was also apparent that many of the members of our club who have made a significant contribution to the study of mollusks would be ignored under such a limitation. I have, therefore, altered the original purpose of this paper to include those who have made such contributions and to give a brief synopsis of work they are now doing or have recently completed.

It should be pointed out that our club has three types of membership. These are Regular Members, Corresponding Members and Honorary Members. The contributions mentioned herein have been made by all three types of members.

Dr. Joshua Baily, of La Jolla, who is an honorary member of our club, has made vast contribution to the study of mollusks. Neither my research facilities or limited space would permit a complete listing of the many papers he has published. A few of the shells named for Dr. Baily include one generic name, genus Bailya Smith, 1944, which is in the family Buccinidae. Dr. Baily is the author of genus Maxwillia Baily, 1950, which has recently been shown to be a subgenus under Aspella Morch, 1877. Some of the shells named in honor of Dr. Baily are Barbatia bailyi (Bartsch 1931), Cyclotremiscus bailyi (Hertlein & Strong, 1951), Nassarius bailyi (Pilsbry & Lowe, 1932) and Solariorbis bailyanus Pilsbry & Olsson, 1952. Dr. Baily is a charter member of the San Diego Shell Club and is a research associate in malacology at the San Diego Natural History Museum.

Emery P. Chace and Elsie M. Chace. Recently, at the annual meeting of the Western Society of Malacologists, at the University of Redlands, those of us from the San Diego area were very pleased to renew our acquaintance with Mr. and Mrs. Emery Chace. To those of you who may not know them the Chaces are both charter members of our club and both hold honorary membership cards. Mr. Chace was Curator at the San Diego Museum from 1954 until he retired. It was in the performance of his duties as Curator that many of us remember him best. He was always ready to assist the collector as well as the serious student with their molluscan problems. Since his retirement the Chaces have made their home in Lomita, California. Because of their long and continued interest in molluscan studies, beginning in 1910, it is not surprising that many new species have been named in their honor. These include genus Chaceia Turner, 1955, one of the genera



of Pholadidae. Species named for the Chaces are Orbitella chacei (Dall, 1916), Mopalia chacei Berry, 1919, Odostomia chacei Bartch, 1927, Goniobasis chacei Henderson, 1935, Opalia chacei Strong, 1937, Pomatiopsis chacei Pilsbry, 1937, Micrarionta chacei Willett, 1940, Moniliopsis chacei Berry, 1941, Crassispira chacei Berry, 1941 and Trivia elsiae Howard & Spohn, 1960. Among shells named by Mr. Chace are Monadenia fidelis beryllica Chace, 1935 and Nassarius howardae Chace, 1958. At the annual meeting of the American Malacological Union, Western Division at Asiloma, California, in 1960, the Chaces received the honor award of the year in recognition of fifty years of distinguished work in conchology. They have always had a deep interest in both marine and terrestrial mollusks and have published many papers pertaining to both interests. Their appearance at the annual meeting of the W. S. M. is an indication that their interest has not lessened after all the years devoted to it.

Dr. George Radwin, Curator of Marine Invertebrates at the San Diego Natural History Museum, served as vice-president of our club in 1969. Since coming to the museum he has successfully undertaken the prodigious task of relabelling and reorganizing the museum's large shell collection. In this work he was assisted by volunteers from our club. Two of those who gave many hours to this work are Carole Hertz and Barbara Good. Billee Dilworth and Norman Currin also assisted with this work. This work has made the museum's collection among the best curated to be found anywhere. Two molluscan names honoring Dr. Radwin are subgenus Radwinia Shasky, 1970 and Murexiella radwini Emerson & D'Attilio, 1970. He was co-author with Dr. William K. Emerson of Hindsiclava hertleini Emerson & Radwin 1969, and with Anthony D'Attilio of Muricopsis jaliscoensis Radwin & D'Attilio, 1970. Recently published is the paper co-authored with Joe Bibbey describing Mitra (Pleiopytgma) helenae Radwin & Bibbey, 1972. This unusual species was named for the late Helen Thompson who was a member of our club. Two specimens of this new Mitra were acquired by Ivan Thompson while on a trip to Florida earlier this year. At present Dr. Radwin and Anthony D'Attilio are making the final revisions and additions to their new book on the family Muricidae. Hopefully it will be with the publisher soon. He is also awaiting the publication of another paper which will be of special interest to those specializing in shells of this area. The paper was co-authored with Anthony D'Attilio and pertains to the very small Muricidae of the eastern Pacific. It will have one new generic name and two new species will be described.

Dr. Rduolf Stohler, University of California, Berkeley, is an honorary member of our club. His vast contribution to the field of malacology is well known to all of us. Perhaps most of our club members know him by



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for his researches on Olivella biplicata, which culminated in his paper, Growth Study in Olivella Biplicata (Sowerby, 1825), published in The Veliger, Vol. 11, No. 3, January 1969. His studies were made over a period of nine years and a large part of these studies were made in the flood control channel adjacent to the entrance to Mission Bay. Fay Wolfson and Billee Dilworth, of our club, assisted Dr. Stohler in this work from the beginning and before it was completed almost all of our members had participated.

It is in the capacity of an administrator that many people know him best. His outstanding knowledge and ability, combined with a boundless energy, has made it almost imperative that he serve in this way. Those of us who were privileged to sit in at the formation of the Western Society of Malacologists, in 1968, know that the successful launching of that organization was due mostly to the influence and ability of Dr. Stohler. Since he has been its Editor-In-Chief from the beginning he deserves full credit for the unique status of The Veliger, the vehicle of the California Malacozoological Society. His insistence on a standard of excellence has made The Veliger the finest publication of its kind in the field.

Dr. Dwight W. Taylor, Research Associate in Paleontology at the San Diego Natural History Museum, has published many papers in terrestrial, fresh-water and brackish water mollusks, especially those of western North America. All of us who are interested in these shells are familiar with at least some of his work since he has probably contributed more to this field of study in recent years than any other worker. Since a large part of the area in which he has worked has had little or no scientific coverage it was almost certain that a large number of new species would be found. This has been the case. Among new generic names authored by Dr. Taylor are genus Coahuilix Taylor, 1966, genus Mexipyrgus Taylor, 1966, genus Mexithauma Taylor, 1966 genus Nymphophilus Taylor, 1966, and genus Paludiscala Taylor, 1966. In his paper, A Remarkable Snail Fauna from Coahuila, Mexico, published in The Veliger, Vol. 9, No. 2, October 1966, Dr. Taylor described and named a total of fourteen new species belonging to seven genera. This may give us a hint of what to expect when his new books are off the press. One of his new books will cover the fresh-water and brackish-water mollusks of western North America, (including western Canada and most of western Mexico). Its range will extend eastward to include Texas also. The other book will be on the land mollusks of California. At this writing Dr. Taylor is on a field trip to Canada which, it is hoped, will be most successful.

Anthony D'Attilio, of the San Diego Natural History Museum, is a regular member of our club. In the many years he has been actively inter-

ested in mollusks he has made such a vast contribution to our knowledge of them that it would be impossible to list all of his work here. That such a contribution could not fail to be recognized by his contemporaries is attested to by the award he received from the Western Society of Malacologists, at Asilomar, in 1971. This award is not given every year but is occasionally bestowed on those who have made outstanding contributions over a long and continuing number of years. It is the highest recognition given by the W. S. M. and was awarded to him for his contributions, both as a recognized authority of the Muricidae and Coralliophilia and for his many superb biological illustrations, which are among the finest in the field and which have appeared in many books and scientific publications whroughout the country. Since our club was the host club for the 1971 meeting of the W. S. M. this award was the highlight of the meeting for all of us who were present.

During the many years he was with the Department of Living Invertebrates at The American Museum of Natural History he co-authored many papers with Dr. William K. Emerson. In many of these papers new species of mollusks were described. It was in recognition of his contribution to the study of mollusks that Dr. Emerson named genus Attiliosa in his honor in 1968. Some of the species names he has authored or co-authored are Latiaxis dalli Emerson & D'Attilio, 1963, Aspella angermayerae Emerson & D'Attilio, 1965, Latiaxis garrardi D'Attilio, 1968, Strombina deroyae Emerson & D'Attilio, 1969, Murexul jacquelinae Emerson & D'Attilio, 1969, Pterynotus macleani Emerson & D'Attilio, 1969, Murexiella radwini Emerson & D'Attilio, 1970, Paziella galapagana (Emerson & D'Attilio, 1970), Muricopsis jaliscoensis Radwin & D'Attilio, 1970, Latiaxis santacrusensis Emerson & D'Attilio, 1970, and Haustellum wilsoni D'Attilio & Old, 1971.

At present he is awaiting publication of the book on Muricidae which he co-authored with Dr. George Radwin and a paper on the very small Muricidae of the eastern Pacific which was also co-authored with Dr. Radwin.

William E. Old, Jr., of the Department of Living Invertebrates, American Museum of Natural History, is probably as well known to shell collectors throughout the United States as any other worker. His painstaking efforts on behalf of the individual with molluscan problems are well known to us all. He has been a corresponding member of the San Diego Shell Club for many years. On those occasions when he has visited San Diego he has always attended our meetings, if time permitted, and has been guest speaker at our regular meetings a few times. In his long and productive carrer with the American Museum of Natural History he has authored or co-authored many important papers pertaining to mollusks and in many of these new species have been named. At least one species, Strombus oldi Emerson,



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1965, has been named in his honor. A few of the species names he has authored or co-authored are subgenus Lotoria Emerson & Old, 1963, which is in the Cymatiidae, Cymatium perryi Emerson & Old, 1963, Scalptia mercadoi Old, 1968, a very beautiful and unusual Cancellarid that was sent to him to describe and name by Clifford and Waneta Ames while they were in the Philippines. He also co-authored Haustellum wilsoni with Anthony D'Attilio in 1971. He was a member of the Ameripagos Expedition to the Galapagos Islands in 1971 and in a large measure was responsible for the great success that expedition enjoyed.

David K. Mulliner, Research Associate in Marine Invertebrates, San Diego Natural History Museum, was President of our club in 1967 and Vice-president in 1966. He was the first President of the Western Society of Malacologists in 1968 and presided at the meetings in which that organization was founded. He has given illustrated lectures to our club on many occasions. Although he is well known for his studies of the Opisthobranchiata he is also interested in all classes of mollusks and has kept many of them in his aquariums for study as living specimens. Equally well known for his superb photography he has been the official photographer of our club for many years, photographically recording such events as our annual auction and party, our fall party and our Christmas party. It was no surprise to those who know him that he won the highest award for photography at the Santa Barbara Shell Show this year, winning a beautiful silver trophy and several ribbons. His photographs of living mollusks are the finest to be found and have appeared in several publications. He photographed the plates for the forthcoming book by Dr. George Radwin & Anthony D'Attilio as well as for the recently published paper by Dr. Radwin & Joe Bibbey describing Mitra helenae. At this writing he is making preparations for a special exhibit of his photographic work at the San Diego Natural History Museum.

Twila Bratcher, of Hollywood, has been a member of our club for many years. Her special interest and work in the Terebridae has made her a recognized authority on the shells of this family. She, together with Robert Burch, made all of the revisions and additions to the section on Family Terebridae in the second edition of "Sea Shells of Tropical West America" by A. Myra Keen. She has published many papers on mollusks and has had at least one shell, Splendrillia bratcheri McLean & Poorman, 1971, named in her honor. Epitonium billeeianum (Dushane & Bratcher, 1965), was originally described by her and Helen Dushane and was named for her sister, Billee Dilworth, who has been a member of our club since its founding. The first known specimens of this unusual shell were found by Billee while



12 diving off the southwest end of Cerralvo Island in the Gulf of California. Mrs. Bratcher has co-authored the descriptions of many other shells. Among them are Terebra allyni Bratcher & Burch, 1970, Terebra brandi, Bratcher & Burch, 1970, Terebra dorothyae Bratcher & Burch, 1970, Terebra hancocki Bratcher & Burch, 1970, Terebra hertleini Bratcher & Burch, 1970, Terebra jacquelineae Bratcher & Burch, 1970, Terebra purdyae Bratcher & Burch, 1970, Terebra shyana Bratcher & Burch, 1970. The Terebra purdyae was named for Ruth Purdy who is a member of our club and who has been most generous in the use of her outstanding Panamic collection to serious workers. Mrs. Bratcher was a member of the Ameripagos Expedition and has collected extensively throughout the world. She has held many offices in malacological organizations. In the Western Society of Malacologists she has served as Exhibits Chairwoman, Member at Large and was its Vice-president in 1971. She has been elected President of that organization for 1973.

Two other members of our club who live in the Los Angeles area and who have made noteworthy contributions to the study of mollusks are Rose Burch and Bertram C. Draper. Both are corresponding members of our club. Together with her husband, John Q. Burch, Rose has coauthored many papers pertaining to mollusks and has described several new species. Their publication, "Catalogue of Recent and Fossil Olives", has been a standard reference work to most collectors for many years. Oliva incrassata forma burchorum Zeigler, 1969, was named for them. One of the shells named by them is Homalocantha zamboi Burch & Burch, 1960, perhaps the most spectacular species of the genus.

Bert Draper, President of the Conchological Club of Southern California in Los Angeles, has specialized in the study of minute species of mollusks. He has given slide illustrated lectures to our club on two occasions and has stimulated interest in the very small shells among several of our members. He was Chairman of a workshop on the minute shells at the 1972 meeting of the W. S. M. which some of us from the San Diego area were fortunate enough to sign up for. Together with Dr. R. Tucker Abbott and Twila Bratcher he judged the exhibits at the Santa Barbara Shell Show this year. Currently he is compiling material toward the publication of a work on minute shells. He plans to use photographs of as many holotype specimens as possible and has already photographed these at the California Academy of Sciences. He will also photograph those in The United States National Museum.

Phillip W. Clover, of the United States Navy, was a very active member of our club while he was stationed in San Diego. For the past few years

he has been on duty in Spain. His collection probably contains more genuine rarities than any other privately owned collection I know of. For many years, in addition to his Navy duty, he has operated a very successful mail order shell business. He has personally collected shells in many parts of the world, including Japan, the Philippines, Ceylon, the Mediterranean and Atlantic coasts of Spain and the west coast of Africa. He has written several papers pertaining to mollusks and has published "A Catalog of Popular Marginella Species with Values". The latter publication having one hundred seventeen species illustrated. He has had one shell named in his honor, the beautiful Lyria cloveriana Weaver, 1963, and has described one species himself, Cypraea (Lyncina) joycae Clover, 1970, which was named for Joyce (Mrs. Phillip) Clover. In a recent communication Phil stated that he plans to return home soon, his tour of duty in Spain being almost finished, so it is hoped that we will see the Clovers at our meeting again very soon.

Louis B. Mousley, of the Mousley Museum of Natural History, Yucaipa, California, is a corresponding member of our club. He is deeply interested in all phases of natural history and at least one shell, Melampus mousleyi Berry, 1964, has been named in his honor. Incidentally, the Mousley Museum is well worth your visit, so stop by the next time you are in that area.

Since it's founding in 1961 the San Diego Shell Club has had many of it's members to serve as officers. The following is a list of those who have have held elective offices in our club.

<u>Year</u>	<u>President</u>	<u>Vice-Pres.</u>	<u>Secretary</u>	<u>Treasurer</u>
1961	John Souder	David Leighton	Kay Webb	Kay Webb
1962	John Souder	Fay Wolfson	Ouida White	Florence Hobbs
1963	Fay Wolfson	George Metz	Priscilla Sloan	Barbara Good
1964	Norman Currin	Billee Dilworth	John Souder	Clyde Field
1965	Billee Dilworth	George Hanselman	James Stockman	Clyde Field
1966	James Stockman	David Mulliner	Carole Hertz	Jo Blake Nola Michel
1967	David Mulliner	Elizabeth Baker	Carole Hertz	Nola Michel
1968	John Souder	Norman Currin	Ruth Book	Nola Michel
1969	Nola Michel	George Radwin	Barbara Good	Carole Hertz
1970	Carole Hertz	Nola Michel	Barbara Myers Barbara Good	Margaret Mulliner
1971	Roland Taylor	Clifton Martin	Clifford Martin Virginia Hanselman	Margaret Mulliner
1972	Clifton Martin	John Michel	Clifford Martin Jeanne Pisor	Kaytaylor















